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Royal Botanic Gardens
Melbourne

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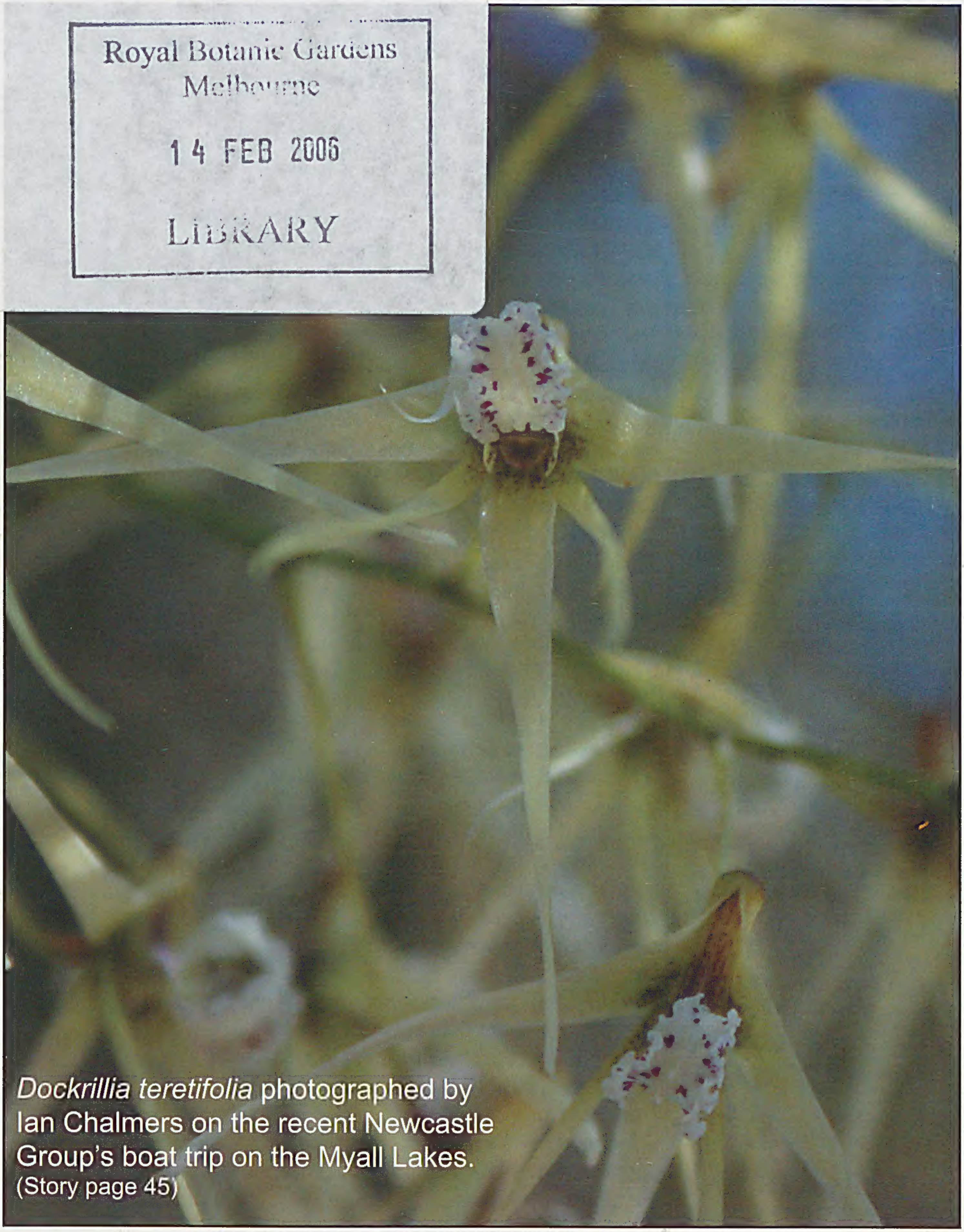

Dockrillia teretifolia photographed by Ian Chalmers on the recent Newcastle Group's boat trip on the Myall Lakes. (Story page 45)

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Editorial

Several years ago a new member to ANOS Warringah Group said to me that he was fascinated by the many different things that people do in relation to native orchids. The studies of our orchids certainly are many as they are varied. In this issue Margaret Collins, from Western Australia, is studying orchid germination, among other things, and came across an interesting observation; that over the years authors have considered germination of orchid seed as successful at different stages of seed development. Something I have not really thought about but must be important for the orchid, interesting reading. Also ANOS Newcastle Group hired a boat to look at the *Dockrillia teretifolia* growing on the banks of the Myall Lakes, a different way from the regular methods for an orchid outing. I believe that this has become so popular that you need to book six months earlier to get a place on the boat.

Other articles in this issue are from Alan Logan about a newly found *Sarcochilus* species he has come across in Queensland and some research he has done on similar species. Bill Lavarack has written about *Dendrobium carronii* which he discovered and helped name. Grahame Leafberg from New Zealand writes about his Grand Champion Orchid of the Fantasia's International Orchid Show in Hamilton, New Zealand. Alan Stephenson explains about the Protection or Destruction of orchid habitats, Eddie Boudette gives us a Show report on Kabi Groups Spring Show and David Jones describes two new Spider Orchids from South Australia.

Sex and Death at the Royal Botanic Gardens in Sydney.

Don't worry this is not a newspaper report about unscrupulous dealings happening at the Royal Botanic Gardens, but an exhibition which is being displayed in the Sydney Tropical Centre. This exhibition will run for three years and features orchids and carnivorous plants, both form Australia and overseas. Many of the orchids are on loan from Royale Orchids at Peats Ridge so there will be a wonderful display all the time.

A new orchid information service.

David Banks, former Editor of The Orchadian and current Editor for the Australian Orchid Review has a new orchid information service which he emails out. It has information on shows, Orchid Fairs, Open Days, other web sites of interest so if you are interested in receiving the newsletter email David at davidpbanks@veritel.com.au and ask to be added to the mailing list. I came across this little bit of info:-

Dockrillia banksii

In the October/November 2005 issue of the Australian Orchid Review Vol.70(5):17-21, respected botanists David L. Jones & Mark A. Clements from the Australian National Herbarium in Canberra named a 'new' orchid species after me, as *Dockrillia banksii.* This is the orchid that was known in horticulture for many years as the "Watagans" form of *Dockrillia striolata* (previously *Dendrobium striolatum*). A number of awarded clones/ cultivars such as 'Ada', 'Frills', 'Redback', 'Neville' and 'Ruffles' should now correctly be recognised under the new species name. It's the first time that I have had an orchid named after myself, and am pleased that it is a New South Wales endemic species that is popular in cultivation, and in one of my favourite genera, *Dockrillia* (named after Alick Dockrill) – the pencil orchids.
Congratulations David.

Have a great holiday season and I hope you all have a bigger and better year ahead. Peter.

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Cryptostylis hunteriana, still on Sydney's North Shore.

In the December issue last year I reported on finding this rare orchid, (page 480, Volume 14 no.10). I received a phone call from Ron Howlett who helped me last year with details for the NPWS atlas, informing me that this year there were three flowering plants. I visited the area and found two with flowers and one that seemed to be between flowers, two had finished but more still to come. I thought the plants were smaller this year and wondered why this may be? I imagine that the rains we have had in Sydney over the past twelve months would have been favourable for optimum growth. I do not know how the orchids underground parts are so I'm not sure if there are three seperate plants or three flowers coming from one undergroud plant. If anyone can help me with this I would be grateful as I am reluctant to want to dig or scratch around the base of the plant. So far they have not been eaten I guess that there is a little more vegetation around this year which may help hide it from hungry animals or grubs. I also found close by a large colony of *Cryptostylis subulata*, which means we have all three species of *Cryptostylis* known in Sydney growing close together. If they do share a common pollinator then it would be hopeful to see some seed pods on the *C. hunteriana* this year.

I remember reading an article from Tony Clarke in the June 2005 issue where he mentioned that someone had dumped rubbish nearby an orchid he had been studying for several years, and that we as orchid lovers, should do a little study on our wonderful orchids before they are all buried. As it happens someone has dumped some sheets of iron and other metal objects very close by. So here starts my study on an orchid I seem to be getting very possessive of.

Peter Eygelshoven.

The habitat has more undergrowth this year, hopefully keeping predators away.

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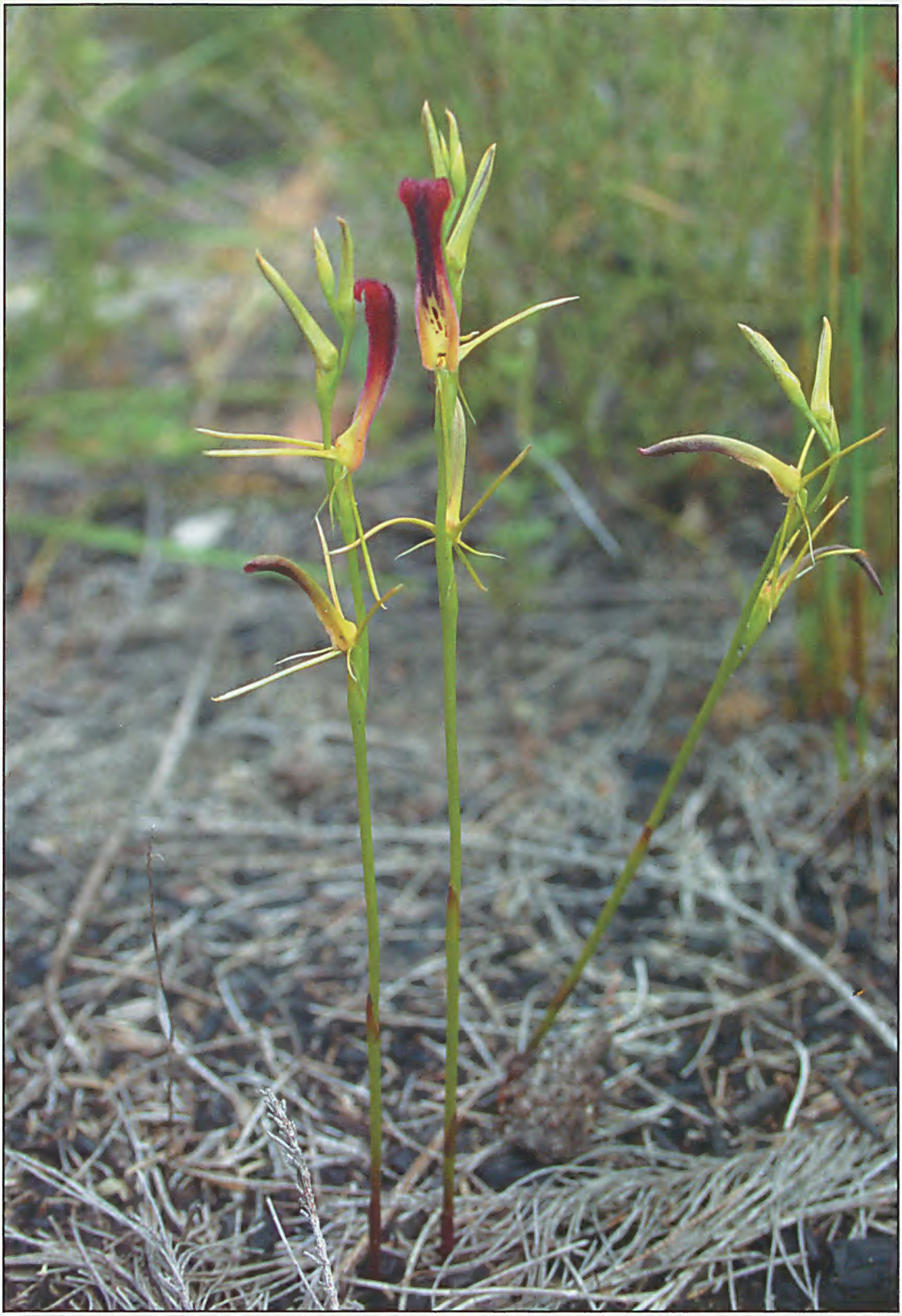

Three flowering plants of *Crytostylis hunteriana*.

Photos Peter Eygelshoven

Sarcochilus minutiflos F.M. Bailey; a valid species, variety or synonym.

Alan E. Logan,
84 Limpus St.
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Sarcochilus hillii (F. Muell) F. Muell is a southern temperate species with a listed distribution from the Illawarra region on the New South Wales south coast, to the Capricorn region of central-eastern Queensland. It is the oldest named species with stable taxonomy in a complex group of small epiphytic "twig" orchids, which also includes the north Queensland *Sarcochilus tricalliatus* (Rupp) Rupp (syn. *S. hilli* var. *tricalliatus* Rupp), and the south-east Queensland *Sarcochilus minutiflos* F.M. Bailey. A recently discovered, possibly undescribed species (*S.* affin. *tricalliatus*) from the same general area as *S. minutiflos* is also included.

Vegetatively, the plant habit of each species is virtually identical, and floral morphology has to be relied on for positive identification. This has created problems in the past with the identification of at least two species in the group; namely *S. minutiflos* and *S. tricalliatus*, with both names being applied to the same plants.

Sarcochilus minutiflos was described and named by F.M. Bailey in 1913 in the publication *Comprehensive Catalogue of Queensland Plants*, from specimens collected by Dr. T.L. Bancroft at Eidsvold, in the Burnett region of S.E. Queensland. In 1936, H.M.R. Rupp described and named the variety *Sarcochilus hillii* var. *tricalliatus*, from specimens collected on Mt Dryander in far north Queensland. Rupp later elevated this variety to species level in 1951 (Upton, 1992).

The status of these two names becomes quite confusing from that point on with both *S. minutiflos* and *S. tricalliatus* being variously listed at species level, at varietal level, and as synonyms of each other and of S. *hillii* (Jones, 1988; Dockrill, 1969 and 1992; Clements, 1982 and 1989; Upton, 1992; Stanley and Ross, 1989; Lavarack and Gray 1992).

Both Dockrill (1969) and Clements (1982) list *S. minutiflos* as a synonym of *S. hillii*, and use *S. tricalliatus* for the north Queensland plants. However, following his studies at Kew in 1983-84, Mark Clements concluded that the types of *S. minutiflos* and *S. hillii* represented separate species. Accordingly, he determined *S. minutiflos* to be the correct name, and reduced *S. tricalliatus* to a synonym of *S. minutiflos* (Clements, 1989). Both Dockrill (1992) and Upton (1992) followed this treatment, but Lavarack and Gray (1992 retained *S. tricalliatus* in their publication.

Dockrill (1969 and 1992) and Jones (1988) both emphasise the similarity of *S. minutiflos/tricalliatus* flowers to those of *S. hillii*, and Dockrill leaves little doubt that he considers these northern plants to be no more than a form of *S. hillii*.

The listed distribution of the *S. minutiflos/ tricalliatus* plants is from the Capricorn region in central-eastern Queensland (Fitzroy River), to Cape York (Princess Charlotte Bay). Only Clements (1989) and Stanley and Ross (1989) include the Burnett region in the orchid's distribution.

The exact northern limit of the *S. hillii* distribution is unknown, as is the southern limit for the *S. minutiflos/tricalliatus* plants; due to confusion in identification between the two. The distribution of both species appears to overlap in the Wide Bay and Burnett regions of south-east Queensland; thus indicating that these areas would constitute a merging (or transitional) zone.

The stated flowering period for the *S. minutiflos/tricalliatus* plants is late spring-summer (November-February), with *S. hillii* starting a month earlier in October. The author has only recorded *S. hillii* in the Burnett region, where it regularly commences flowering in early November.

The potential for even more confusion became apparent during September 2003, when plants of another *Sarcochilus* "twig" orchid were discovered at two sites in the Mt. Walsh National Park, Wide Bay region. Further field surveys during August/ September 2004 and 2005, extended the known distribution to several additional sites at Mt. Walsh. Where required from now on, these plants are referred to as the Wide Bay species.

While the plant habit of this new species is virtually identical to that of the other species in the group, a check of the flowers "in situ" indicated they had more affinity with the *S. minutiflos/tricalliatus* flowers than with those of *S. hillii*. Field notes and close-up photos of floral characteristics were later compared with the published descriptions, line illustrations, and photos of both *S. minutiflos/tricalliatus* and *S. hillii* flowers. Because of previous experience with flowering specimens of *S. hillii*, it quickly became obvious that the flowers of this new species were not closely related to those of that species, but were very, very closely related to the flowers of the northern plants. These Wide Bay flowers differed from the others in the group in the following details; their earlier flowering period (August-September); the absence of labellum lateral calli (only a single, large domed callus present); and the labellum lamina and midlobe hispid with stiff bristles (not glandular hairs as on the other species).

As the Mt Walsh population is only 100 km to the south-east from the type locality of *S. minutiflos*, the question arose 'could these plants be the true *S. minutiflos*?"

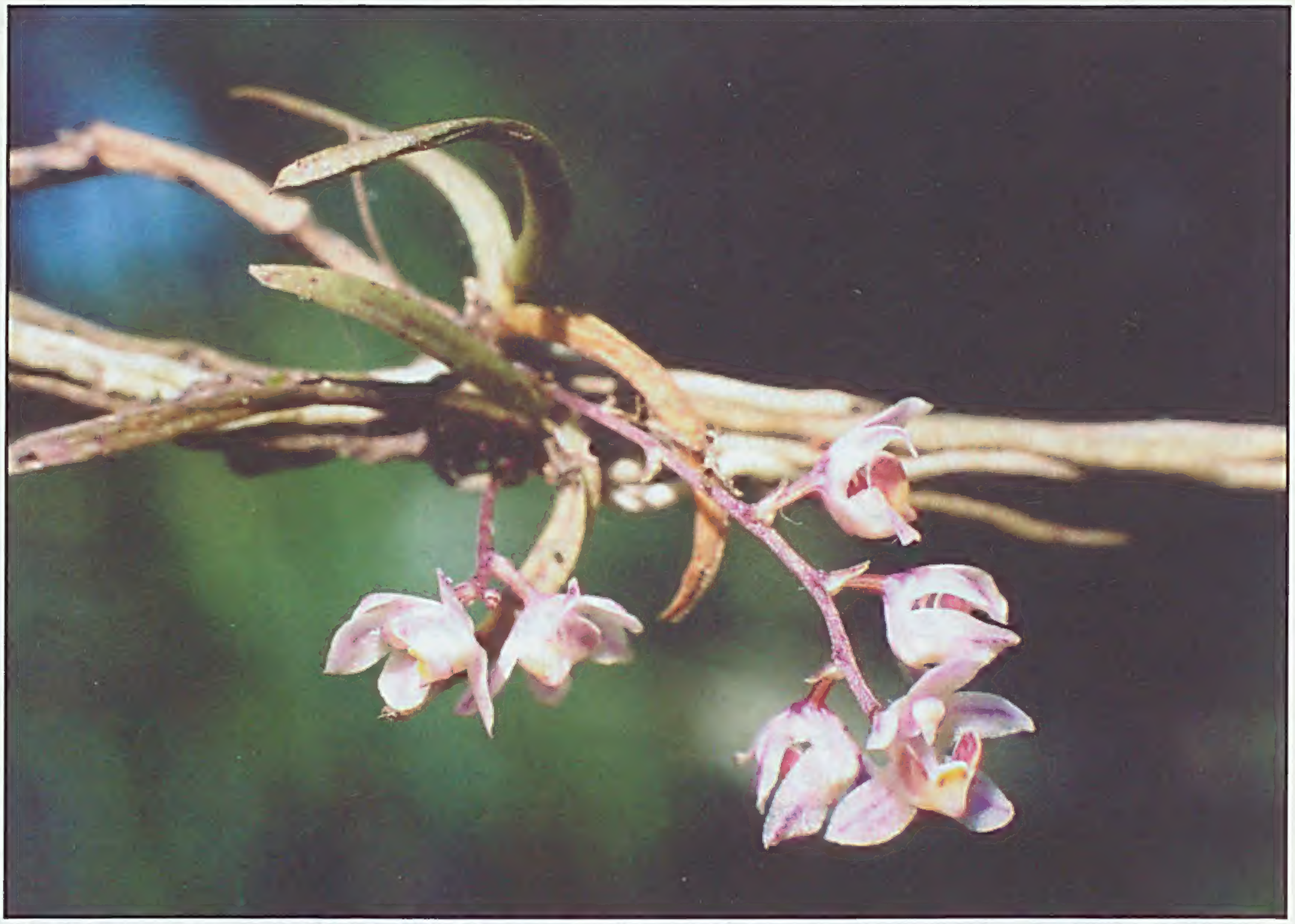
To gain a better understanding of the problem, the author obtained a copy of Bailey's 1913 "*Comprehensive Catalogue of Queensland Plants*" through the inter-library loan service provided by the Wide Bay campus of the University of Southern Queensland. Bailey's description of the *S. minutiflos* type, and the line illustrations by his grandson Cyril T. White, are hereby reproduced from that publication.

As the sepals and petals of all the flowers in this group show considerable variation, the following observations and comparisons are based solely on the labellum morphology of each species.

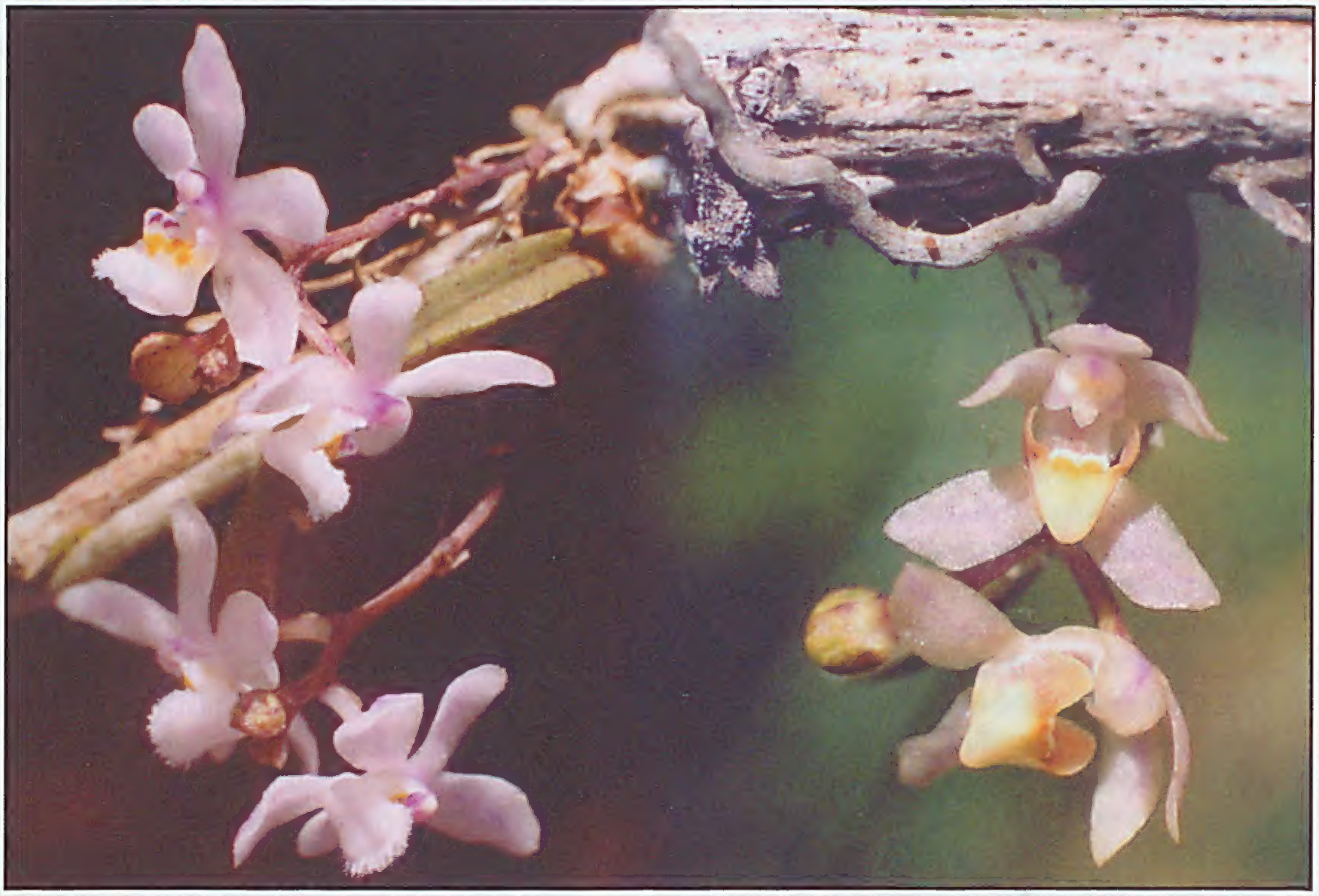
The key to the identification of *S. minutiflos* is White's illustration of a flattened labellum of the type (Fig E.). It is impossible to match this illustration to any other illustration depicting the labellum of the flowers of the northern plants at present being called *S. minutiflos* and/or *S. tricalliatus* (Dockrill, 1992, fig E, page 995; Upton 1992, fig 19 D and I, page 39). These, and the Wide Bay flowers, have a very short, emarginate midlobe that is half as long, or less, than the broader lateral lobes. By contrast, White's illustration clearly indicates that the midlobe and lateral lobes of the type are more or less of similar length; a characteristic applicable to the labellum of *S. hillii*.

In his description, Bailey states that the midlobe of *S. minutiflos* is 'stalked' (ie narrower at the bass), and 'for the most part composed of a globular mass of white glandular hairs'. Because of the shortness of the labellum midlobe on the northern and Wide Bay flowers, it is impossible to describe it as being 'stalked' and the shorter hairs are better described as being a 'patch' (see Dockrill, 1992, fig. E) rather than a 'globular mass'.

A study of the flowers depicted side-on in the published photos of *S. hillii* (Jones, 1988, page 569; Dockrill, 1992 page 996; Upton 1992, page 30, plate 30; Logan, this issue) all show the narrow labellum lateral lobes, the rounded midlobe with the very visible long hairs to the margins, the bright yellow calli and the backward projecting 'spur'



Sarcochilus species - Wide Bay region. Photos Alan Logan



Sarcochilus hillii - Burnett region.

Sarcochilus species - Wide Bay region.

(chin is a better term), so characteristic of that species.

By comparison, the published photos of the northern and Wide Bay flowers (Upton, 1992, page 47, plate32, front-on; Titmuss, 2005, page 500; Logan this issue) are all very similar and quite distinct from those of *S. hillii*. They show the short, emarginate labellum midlobe with the shorter hairs just visible, the broader lateral lobes that hide the labellum calli/callus and the forward projection of the spur. The only way to view the callus on the Wide Bay flowers is to pull the labellum away from the column, and it is considered that the same would apply to the northern flowers.

Bailey describes the flowers of *S. minutiflos* as being 'cupped', and this is illustrated in White's figure B, Compare this illustration with Tony Bishop's photo of a cupped *S. hillii* flower (Bishop, 2000, plate 488). Both are very similar and clearly show the rounded labellum midlobe apex with the long hairs to the margins.

The digitally combined comparison photo on page 56 clearly indicates the differences between the flowers of the Wide Bay species and those of the Burnett S. *hillii* plants.

This complex group of small *Sarcochilus* can be divided into two alliances based on the above observations and comparisons. *S. hillii* and Bailey's type of *S. minutiflos* are very close and form one alliance, while the northern and Wide Bay plants are closer to each other and form the second alliance. The two alliances are quite distinct from each other.

It is the author's opinion (based on the above details) that Bailey's description and White's illustrations of the type of *S. minutiflos* depict a slightly aberrant form of *S. hillii* and the name should be treated as a synonym of that species. This would leave *S. tricalliatus* as the correct name for the northern plants, with the Wide Bay plants being undescribed.

While the above does not positively identify the status of *S. minutiflos*, it should prove that the northern plants are definitely not that species. The possibility exists that future excursions in the Burnett region (particularly in the Mundubbera and Eidsvold districts) may yield flowering *Sarcochilus* specimens that match the description and illustrations of *S. minutiflos*. Should this occur, then it would definitely resolve the controversy regarding this enigmatic species.

Acknowledgements.

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To the Queensland Parks and Wildlife Service for assistance in accessing the remote areas of the Mt. Walsh N/P; to local landowners for permission to traverse private property; to Grahame Muller (Orchidaceous Books) for his valuable knowledge regarding reference material and also to Grahame, Col Fletcher and the late Horst Pfaller for their discussions, comments and companionship during field excursions. And to Michael Harrison for his comments and suggestions on an earlier draft of this article.

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Bailey's description of *S. minutiflos* type.

P535. ---- *Sarcochilus*, after Hillii, F. v. M., add:-

Minutiflos, Bail., sp. nov. (Fig 974). On branchlets of shrubs and trees. Roots very long and slender, mostly white and more or less curled. Stem very short. Leaves several, slender, 2-4 in. long and about 2 lines broad, sometimes dotted. Racemes numerous, very slender, from 2-6 in. long, sometimes forked, bearing throughout their whole length or nearly so very numerous flowers. Flowers on slender pedicels of about 2 lines, globular from the incurving of the sepals and petals, of greenish white sometimes tinged with pink, and less than 2 lines in diameter. Bracts minute. Sepals somewhat larger than petals. Labellum small, the lateral lobes purplish, blunt, ovate-oblong, middle lobe stalked, for the most part composed of globular mass of glandular hairs. Disc calli orange yellow. Column short; anther-lid stained with purple. Capsule narrow, straight, 2-2½ in. long.

Hab.: Eidsvold, Dr T.L. Bancroft.

-oOo-

846 ADDENDA AND CORRIGENDA.

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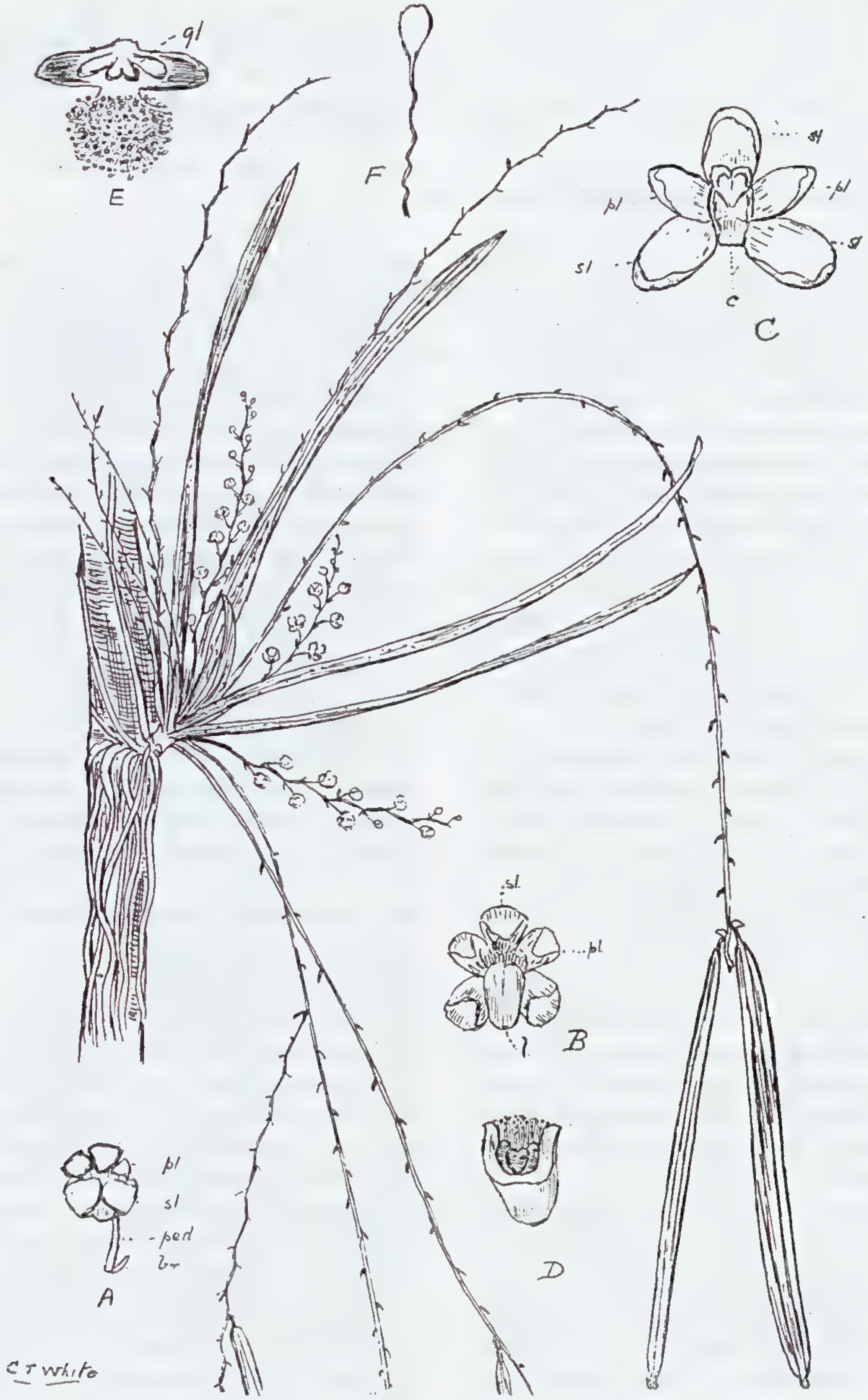

974. SARCOCHILUS MINUTIFLOS, *Bail.*

(A) Flower, (B) flower more fully opened, (C) flower, labellum removed, (D) labellum from the front, (E) lobes of the labellum; (F) a single hair from the middle lobe of the labellum. (A)—(F) enl. (br.) bract, (ped.) pedicel, (pl.) petal, (sl.) sepal, (l.) labellum, (c.) column, (gl.) gland or disc calli.

How do you determine when orchid seed germination has been successful?

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Key words: orchid, seed, germination, mycorrhiza

Currently, I am engaged in postgraduate studies on Australian terrestrial orchids and my previous research experiences with orchid conservation, propagation, seed germination and more recent studies on mycorrhizal associations has prompted me to examine exactly how 'successful germination' in these fascinating plants is best defined. The family Orchidaceae is one of the largest and most diverse Angiosperm families with an estimated 20,000 to 35,000 species (Dressler 1993), of which about 19,000 have been named. This represents almost 10% of the world's flowering plants, revealing Orchidaceae to be an extremely successful family that has adapted to a wide range of habitats. Orchids are very diverse vegetatively as well as floristically, they may, for example, be large vines many metres long (*Vanilla*), tiny epiphytes only 3-4 mm tall (*Bulbophyllum*), leafless, achlorophyllous, tuberous terrestrials (*Gastrodia*) or completely subterranean (*Rhizanthella*). The enormous floral diversity in Orchidaceae is believed to be a reflection of rapid pollinator-orientated evolution (Darwin 1904; Benzing 1981; Dressler 1981) and the difficulty in delineating phylogenetic groups (Dressler 1993) thought to be evidence that the group is actively evolving. Within this mass of variability there are certain consistent attributes; small seed size (Arditti and Ghani 2000), a requirement for fungal stimulation of germination and an early myco-heterotrophic growth phase.

The fungi that mediate germination and early growth belong to *Rhizoctonia* (*sensu lato*) and form mycorrhizal associations that persist throughout the orchids life span. These orchid mycorrhizal relationships are atypical mycorrhiza as all evidence of nutrient transfer is that this is unidirectional; from fungus to plant (Alexander and Hadley 1985; Smith and Read 1997). Myco-heterotrophy implies that the orchids are literally parasitic on their mycorrhizal endophytes (Rasmussen and Whigham 1993; Leake 1994; Rasmussen 1995; Roberts 1999) during the early growth phase. Many orchids, especially those which lack roots, have few leaves or are achlorophyllous, are thought to rely heavily on their mycorrhiza throughout their life span (Harley and Smith 1983; Gebauer and Meyer 2003; Julou *et al.* 2005). These plant-fungus associations may be commensal at best, and have been described as epiparasitic or exploitative (Brundrett 2004).

The Role of Orchid Mycorrhizal Fungus in Seed Germination

Orchid seed is minute and consists of a thin testa and a simple embryo containing little if any endosperm (Wirth and Withner 1959; Arditti and Ernst 1984; Peterson *et al.* 1998). To develop into a viable plant in nature an orchid seed needs to germinate and form an effective fungal association (mycorrhiza) capable of providing the necessary nutrients for growth beyond imbibition, cracking of the testa and early protocorm development. Stimulation of orchid seed germination by a fungus has commonly been regarded as an indication of the capacity of that fungus to establish an orchid mycorrhizal association (Arditti and Ernst 1984; Tsutsui and Tomita 1986; Masuhara and Katsuya 1989; Currah 1991; Masuhara and Katsuya 1994; Rasmussen

1995). But is this definition an adequate representation of the successful start to an individual life for the Orchidaceae?

In most plant taxa the physical manifestations of germination – imbibition, swelling of the embryo and splitting of the testa, also indicate concurrent metabolism of stored nutrients in the endosperm that support the growth of the embryo (Jackson and Jacobs 1985; Lambers *et al.* 1998). It is generally accepted that the predominant metabolic activity in storage tissues during germination is the production of sugars from lipids (Ching 1972). In orchid seed little if any endosperm exists so that the embryo functions as its own nutrient reservoir (Harrison 1977; Manning and van Staden 1987; Peterson *et al.* 1998). However, until an appropriate fungal association is formed, the metabolism of nutrients that is the physiological manifestation of germination does not occur (Harrison and Arditti 1978). Uetake *et al.* (1992) demonstrated, in *Spiranthes sinensis* (Pers.) Ames, that fungal invasion of the embryo was associated with the disappearance of endogenous lipid and hypothesised that fungal invasion may alter embryo metabolic activity providing a stimulus to growth. Richardson *et al.* (1992) also found fungal invasion stimulated protocorm development and concomitant utilisation of lipid and protein reserves in *Platanthera hyperborean* (L.) Lindl.. *In vitro* studies have also shown that orchid seed that will germinate asymbiotically will not do so unless provided with a carbon source in the form of simple sugars (Burgeff 1959; Harrison and Arditti 1978; Arditti and Ernst 1984; Manning and van Staden 1987). In nature this carbon source is provided initially by stimulation of lipid metabolism induced by the invading mycorrhizal fungus, and thereafter is maintained through nutrients supplied by a mycorrhizal association (Smith and Read 1997; Peterson *et al.* 1998).

Defining successful germination

Much of the literature on orchid seed germination and orchid mycorrhiza fails to indicate what the author considers successful germination, rather, regarding this as self-evident (Warcup 1971; 1973; Arditti *et al.* 1982; Arditti and Ernst 1984; Rasmussen 1995; Kulikov and Philippov 2003). Orchid seed passes though a unique developmental stage, the protocorm, between imbibition and rupture of the testa, and the later development of a seedling. The growth stages of the protocorm have been variously defined by different authors, as has that protocorm growth stage representing successful germination (Table1).

Hadley (1970) observed that development of protocorms to a stage often regarded as indicative of successful germination, namely rupture of testa and/or development of trichomes, could be followed by cessation of growth, parasitism by the fungus and subsequent necrosis. Similar observations have been reported by Warcup (1983) and Muir (1989), and the phenomenon has been repeatedly observed by myself in my work on orchid mycorrhiza, orchid propagation and the recovery of orchids in disturbed environments (Collins unpublished data). Both Hadley and Warcup regarded only substantial growth stimulus, resulting in the production of a leaf, as an indication of successful germination and formation of a functional mycorrhiza. Thus, while rupture of testa and/or development of trichomes, has often been regarded as germination (Table 1) it does not necessarily represent a successful germination capable of producing a healthy plant. This requires establishment of an effective mycorrhizal association capable of supporting growth of the protocorm and nutrition of the seedling.

In an attempt to provide a comprehensive description of protocorm development stages and define a standard, minimal criterion for successful germination of autotrophic terrestrial orchids, an eight-stage germination process (numbered 0-7) is described below (Fig 1). Here successful germination is defined as stage 4: enlargement of protocorm and initiation of leaf primordium. These developmental stages are based on those of Warcup (1973) and Clements (1981), and the criteria for success on the observations of Hadley (1970), Warcup (1983), Muir (1989) and my own experience working with Australian terrestrial orchids.

It is expected that the same criteria will hold for leafy epiphytic orchids, but it should be noted that this criterion can not hold for taxa where no leaf is produced, such as the achlorophyllous orchids. I believe that the answer to the question "How do you determine when orchid seed germination has been successful?" is when the protocorm has initiated leaf development (stage 4 of development). However, final resolution of the question requires comprehensive experimental work following the growth and survival of each developmental stage to seedling.

Table1: Comparison of criteria used by different authors in the literature to define germination and describe protocorm development stages of autotrophic terrestrial orchids. *These definitions and descriptions are compared with development stages described in this paper in the column labelled Stage.

Reference	**Definition of Successful Germination**		**Development Stages Described in Reference**
	Description	**Stage***	
Stages defined in this paper (Fig. 1)	enlargement of protocorm and initiation of leaf primordium	4	0 unimbibed seed 1 imbibed seed, embryo swollen 2 ruptured testa, occasional trichome 3 enlarged protocorm, numerous trichomes 4 initiation of leaf primordium 5 leaf elongation 6 initiation of dropper 7 tuber and root formation
Hadley (1970)	marked growth stimulus	4-5	0 no infection s compatible infection S marked growth stimulus
Warcup (1973)	not defined	not defined	0 no germination 1 cracked testa 2 2-3 x original volume 3 protocorms longer than seed coat 4 protocorm larger 5 shoot differentiation initiated 6 green leaf
Clements (1981)	green leaf	5	0 no germination 1 cracked testa 2 2-3 x original volume 3 protocorms longer than seed coat 4 protocorm larger 5 shoot differentiation initiated 6 green leaf

Table1 contd.

Reference	Definition of Successful Germination		Development Stages Described in Reference
	Description	Stage*	
Warcup (1983)	shoot formation	4-5	0 no symbiosis P parasitism (+) partial development of protocorm + protocorms with shoot formation
Clements *et al* 1986	not defined	not defined	0 ungerminated seed 1 germinated seed with rupture of testa 2 production of rhizoids 3 production of leaf primordium 4 production of first green leaf 5 production of root initial
Ramsey *et al* (1986)	first signs of greening and leaf emergence	4-5	1 seed coat split, embryo slightly swollen 2 embryo enlarged, few trichomes 3 embryo protocorms-like, many trichomes,5-10 x seed volume 4 highly enlarged protocorms, numerous trichomes 5 first signs of greening and leaf emergence
Clements (1988)	green leaf	5	stages 0-6 as defined by Clements (1981)
Tsutsui & Tomita (1988)	broken testa	2	none defined
Masuhara & Katsuya (1989)	torn testa	2	none defined
Muir (1989)	rupture of testa	2	stages 0-5 as defined by Clements *et al* (1986)
Rubluo *et al* (1989)	protocorms formation	3	none defined
Wilkinson *et al* (1989)	first signs of greening and leaf emergence	4-5	stages 1-5 as defined by Ramsey *et al* (1986)
Rasmussen & Rasmussen (1991)	testa ruptured and/or rhizoids developed	2-3	none defined
Rasmussen (1992)	not defined	not defined	none defined
Richardson *et al* (1992)	rupture of testa, enlarged embryo and growth of epidermal hairs	2-3	none defined

Table1 contd.

Reference	Definition of Successful Germination		Development Stages Described in Reference
	Description	Stage*	
Masuhara *et al* (1993)	protocorm development	3	- no germination + protocorms ++ shoot
Masuhara & Katsuya (1994)	rupture of seed coat	2	none defined
Perkins & McGee (1995)	swollen seed, cracked testa	2	+ swollen seed, cracked testa ++ protocorm with apical meristem and trichomes
Perkins *et al* (1995)	swollen seed, cracked testa	2	- protocorms killed by fungus + swollen seed, cracked testa ++ protocorm with apical meristem and trichomes +++ green leaf
Zettler & Hofer (1998)	rhizoid production	1-2	0 no germination 1 rhizoid production 2 rupture of testa 3 appearance of promeristem 4 appearance of first true leaf 5 elongation of leaf and root formation
Hayakawa *et al* (1999)	protocorm hair formation	2-3	- no germination + protocorm hair formation ++ protocorm formation +++ shoot formation
Batty *et al* (2000)	enlargement of protocorm and production of trichomes	3	stages 1-5 as defined by Ramsey *et al* (1986)

Table1 contd.

Reference	Definition of Successful Germination		Development Stages Described in Reference
	Description	Stage*	
Batty *et al* (2001a)	enlargement of protocorm and production of first trichomes	3	0 unimbibed seed 1 imbibed seed with cracked testa 2 first trichomes 3 enlargement of protocorm and initiation of leaf primordium 4 protocorm enlargement with first green leaf 5 seedling with green leaf and initiation of dropper
Batty *et al* (2001b)	enlargement of protocorm and production of trichomes	3	stages 1-5 as defined by Ramsey *et al* (1986)
Kulikov & Filipov (2001)	not defined	not defined	1 seed 2 rupture of testa and rhizoid formation 3 initiation of leaf primordium 4 formation of primary shoot 5 formation of assimilating leaves, roots and storage organs
McKendrick *et al* (2002)	torpedo shaped protocorm, no rhizoids	2-3	0 ungerminated seed 1 changes before rupture of testa; 1a embryo becomes translucent 1b fungal penetration of embryo 1c expansion of embryo with formation of pelotons 2 changes after rupture of testa; torpedo shaped protocorm, no rhizoids 3 changes after branching of protocorm; rootlets develop, differentiated shoot bud develops
Bonnardeaux (2003)	not defined	not defined	stages 1-5 as defined by Ramsey *et al* (1986)

Table1 contd.

Reference	Definition of Successful Germination		Development Stages Described in Reference
	Description	Stage*	
Brundrett *et al* (2003)	not defined	not defined	1 split seed 2 protocorms 3 leaf primordium 4 leaves 5 droppers
Otero *et al* (2004)	swelling of embryo	1-2	0 no germination 1 swelling of embryo 2 development of radical hairs 3 development of leaf projection 4 development of first leaf 5 development of second leaf 6 development of roots
Huynh *et al* (2004)	green leaf	5	stages 1 - 6 as defined by Warcup (1973) stages 1 - 5 as defined by Ramsay *et al* (1986)
Esitken *et al* (2005)	production of rhizoids	1-2	stages 0 - 5 as defined by Zettler & Hofer (1998)
Hollick *et al* (2005 in press)	trichome development	3	none defined
Abdul Karim (2005)	production of leaf primordium	4	stages 0-6 as defined by Clements *et al* (1986) & Ramsay *et al* (1986)

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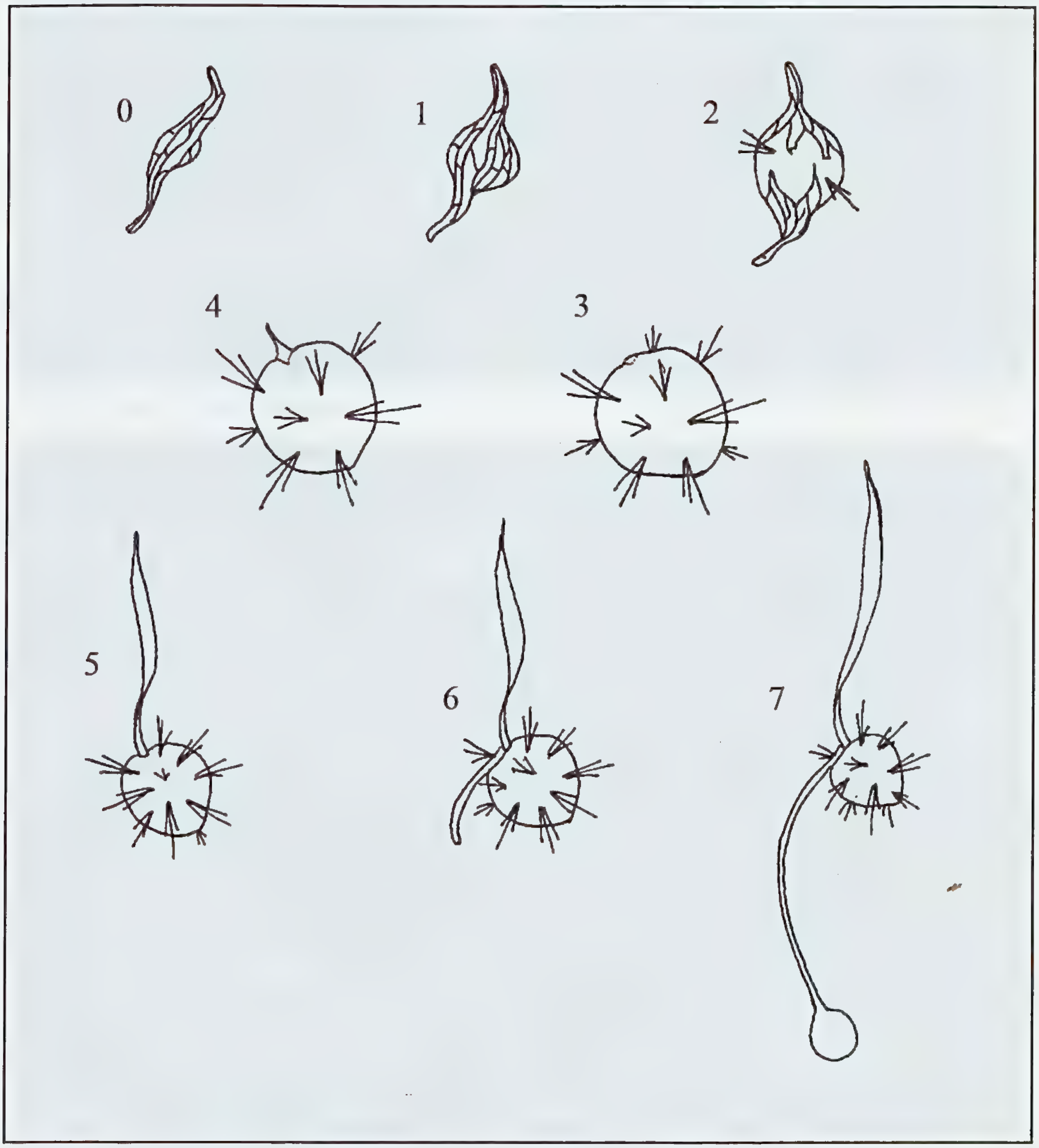
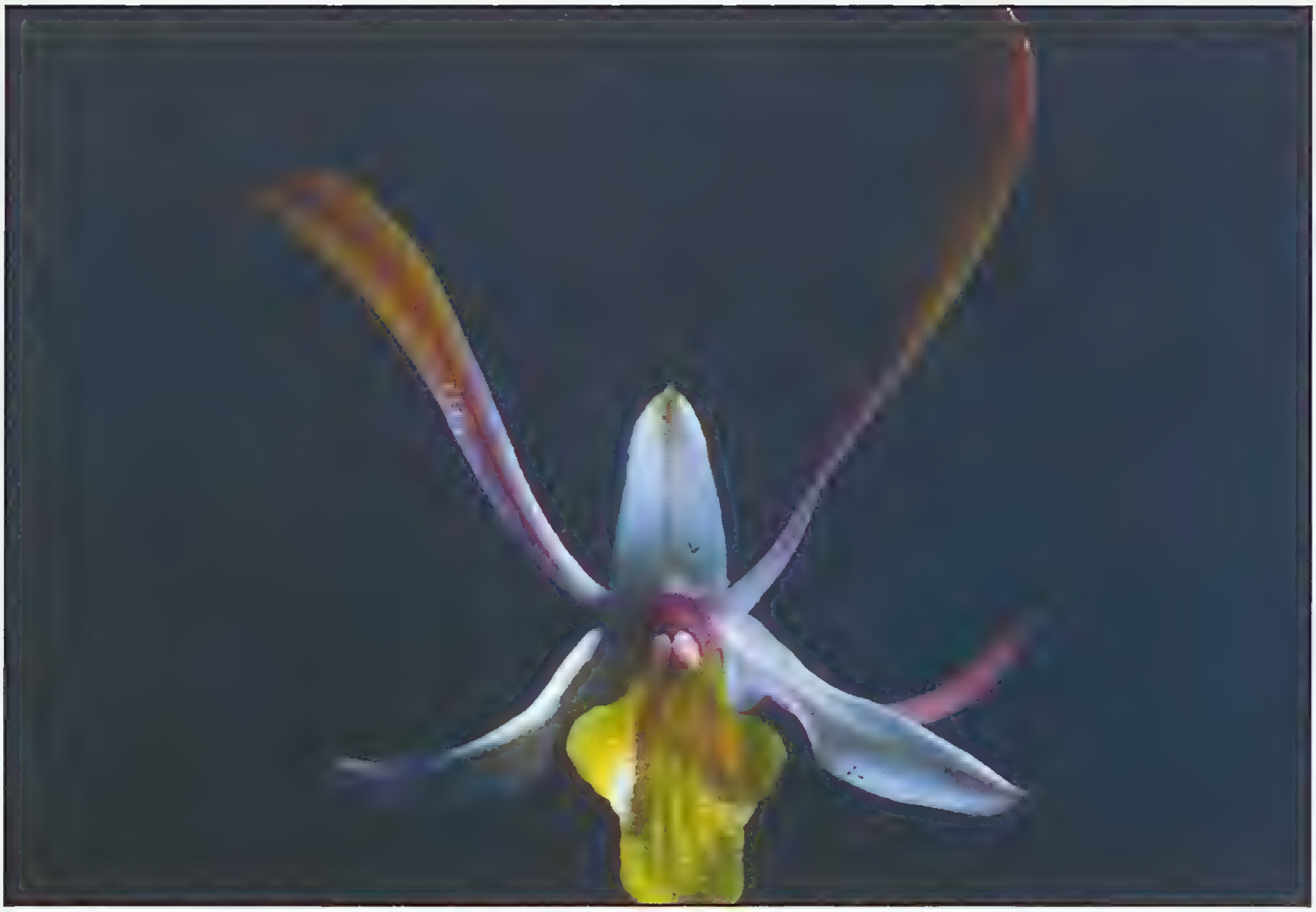
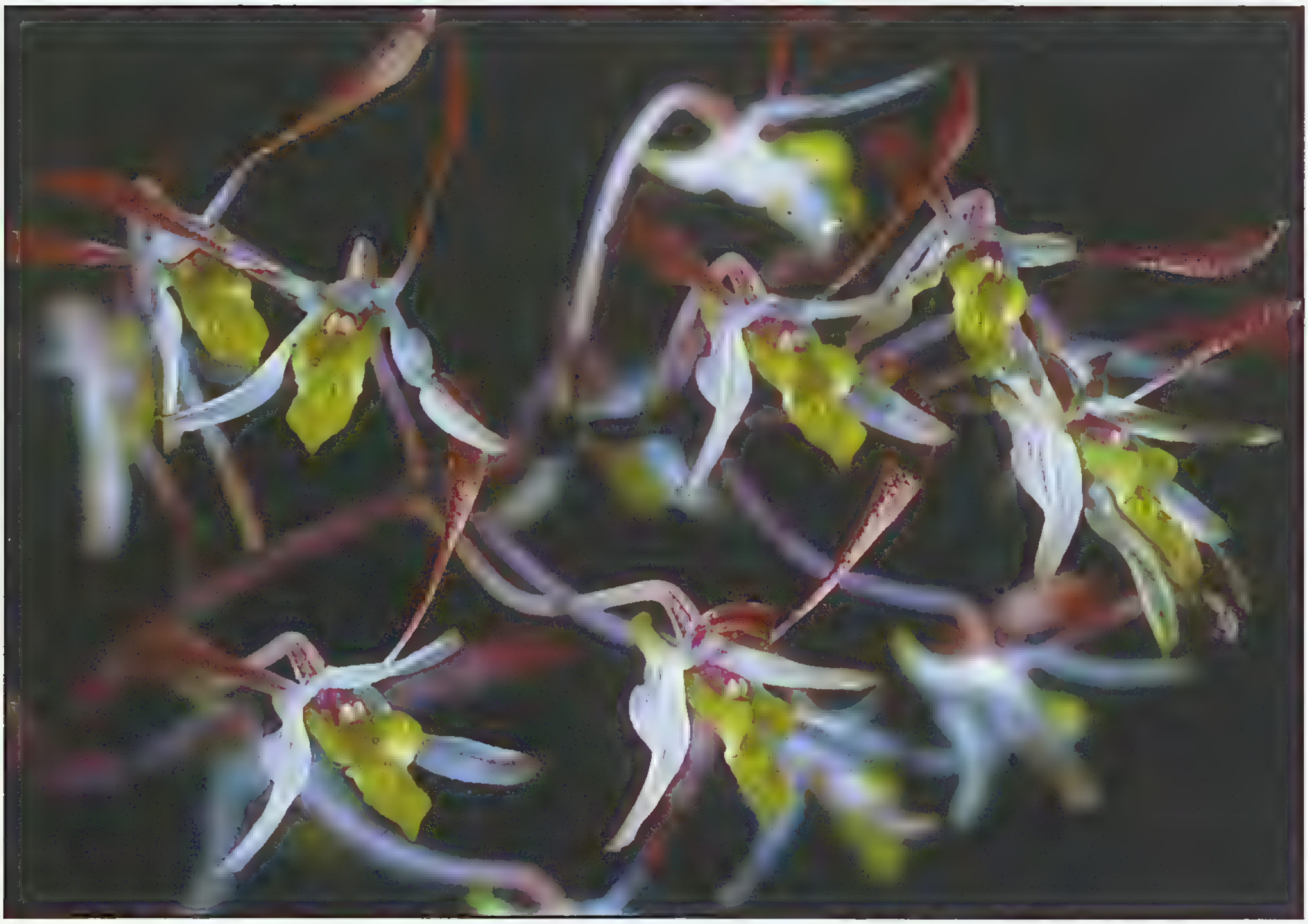
Figure 1. Terrestrial orchid development stages, from seed to seedling: 0 unimbibed seed; 1 imbibed seed, embryo swollen; 2 ruptured testa, occasional trichome; 3 enlarged protocorm, numerous trichomes; 4 initiation of leaf primordium; 5 leaf elongation; 6 initiation of dropper; 7 tuber formation

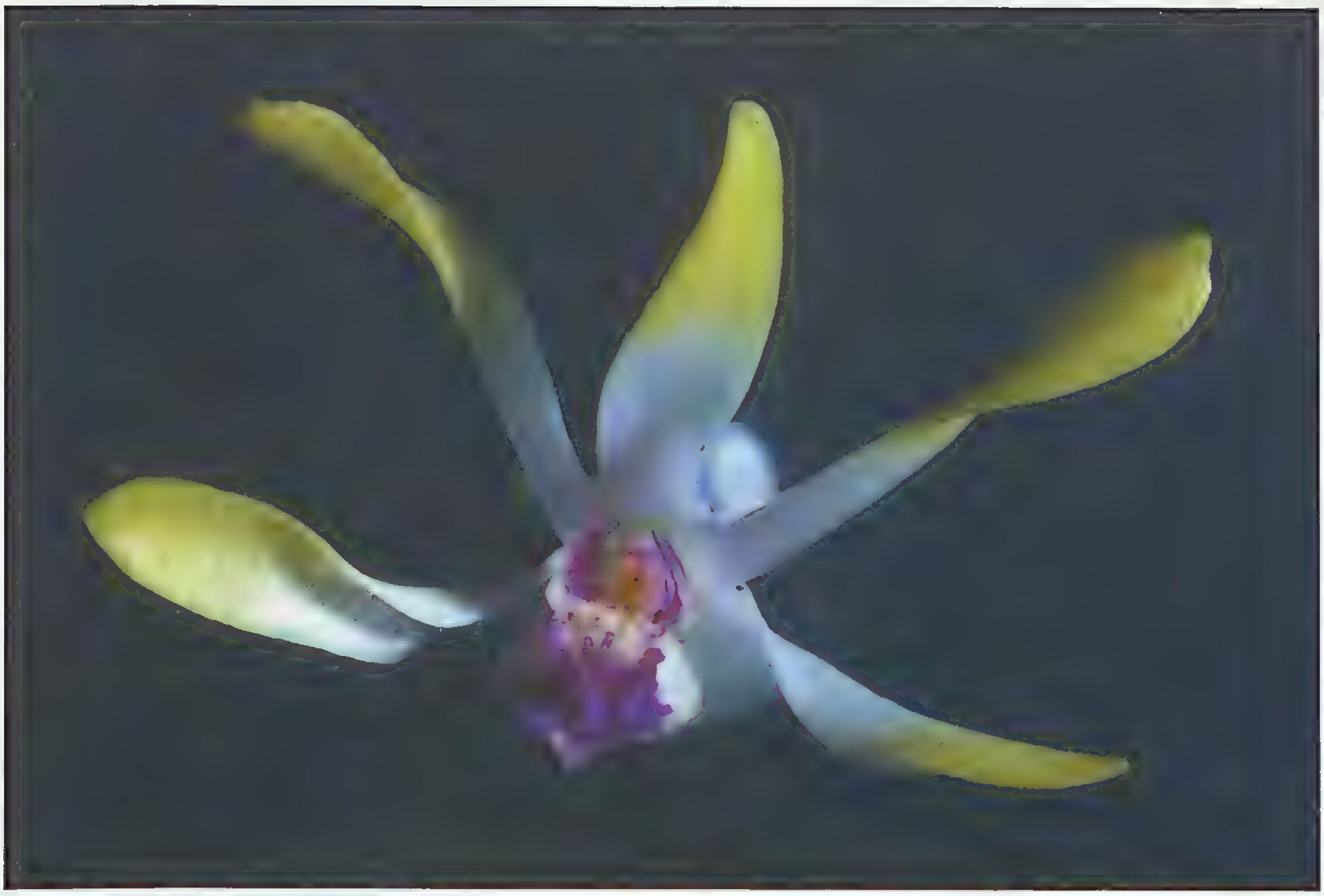




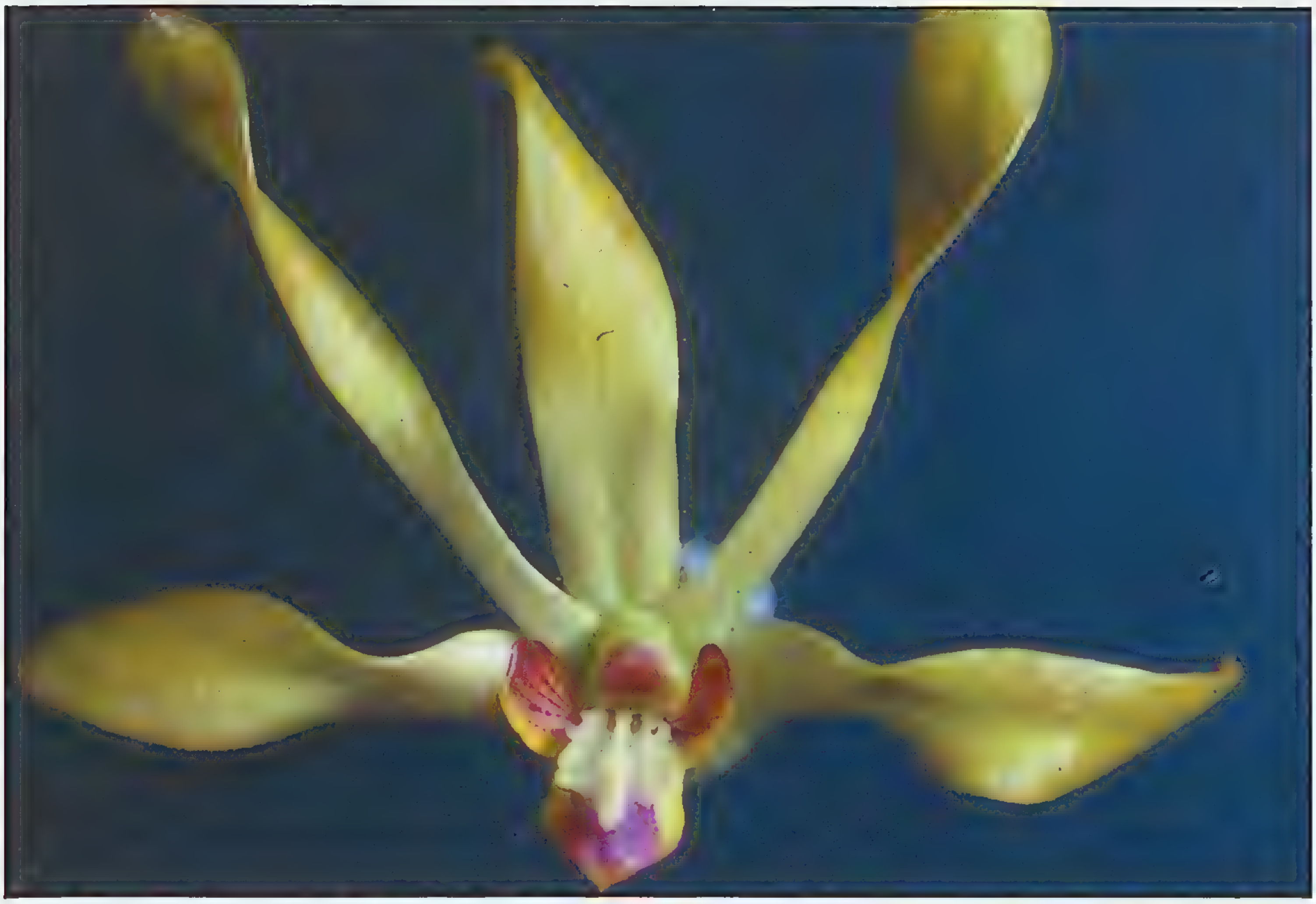
Single flower of *Dendrobium carronii*.



Inflorescence of *Dendrobium carronii*.



Single flower of the southern form of *Dendrobium canaliculatum*, sometimes regarded as a seperate species, *Dendrobium tattonianum*.



Single flower of the Cape York form of *Dendrobium canaliculatum*, often known as variety *nigrescens*, but actually the type form.

Photos Bill Lavarack

The History of *Dendrobium carronii* Lavarack & Cribb

Dr P.S. (Bill) Lavarack
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In the early 1970s stories of a "pink form" of *Dendrobium canaliculatum* had been circulating for some time among orchid growers in north Queensland. A few plants had been collected, and while they had not done well in cultivation, they survived long enough to make some interesting hybrids with other members of the section *Spatulata*, giving the progeny colourful flowers on a compact plant. Even to this day, only a handful of expert growers are able to maintain living plants for more than a year or two. It is very similar to the well known miniature species *D. canaliculatum*, sometimes known as the 'tea tree orchid' or 'onion orchid'. The flowers appear pink when seen from a distance, but there is actually not much pink colour in the flowers, the apparent pink colour being due to the combinations of purple and white on the petals and sepals. It was originally known only from the Iron Range and the McIlwraith Range, both remote and at that time, botanically poorly-known areas of Cape York Peninsula in tropical Australia.

I first saw this species in 1971 when I was doing some national park proposal work at Iron Range. The nature of the work in this remote and poorly explored part of tropical Australia did not allow me to do much botanising, but I certainly saw and collected specimens of this colourful species in the region of Tozer's Gap and in other places. Being familiar with *D. canaliculatum*, I assumed it was a variety of that well known and widely distributed species. However when I later considered the photographs and the specimens, the unique colour combination of purple-maroon petals and, white sepals and the bright yellow lip, along with the shape of the floral parts made me think again. When I also considered that these plants and *D. canaliculatum* grew in different (but adjacent) habitats, I came to the conclusion that perhaps these plants were worthy of the rank of species. At the time I was in regular correspondence with Dr Phillip Cribb of Kew who was working on his revision of the section *Spatulata*. He had seen specimens and photographs of these plants and had independently formed the opinion that this taxon should be raised to species level. When we discovered that we were of the same mind, we agreed to write a joint paper describing it as *D. carronii*.

When searching for a name for this particularly beautiful species, I was drawn the story of William Carron who was the botanist on the ill-fated Kennedy exploring expedition of 1848. This expedition is regarded as one of the great tragedies of Australian exploration. Due to the unanticipated difficulty of the terrain, Kennedy and his twelve companions were in some trouble with fatigue, illness and diminishing supplies when they made their tedious way through the valley between the McIlwraith and Macrossan Ranges on Cape York Peninsula in early October of 1848. At that time of year plants of *D. carronii* would have been in flower and it is most likely that in spite of the difficulties, Carron would have collected specimens, as it is quite abundant in this area. Unfortunately a month later several members of the expedition were incapable of further travel. Kennedy determined to leave the invalids in the care of Carron near the Pascoe River, and attempt to seek help from a waiting ship at the tip of Cape York more than 200 km to the north. He and four others pushed on to his destiny with an Aboriginal spear on the banks of the inappropriately named Escape River. The Aboriginal guide Jackey Jackey was the only one of this group to survive and reach the rescue ship at Newcastle Bay. Of the eight men left behind at the Pascoe River, only Carron and one other were still barely alive when a rescue party arrived six weeks later. Even then the small rescue party was under threat of immediate attack by Aborigines who had been patiently waiting for the survivors to die so they could take their possessions. In the haste to get to the rescue ship while under threat of attack, Carron's specimens were abandoned, so we will never know if *D. carronii* was amongst them. As a tribute to the determination and bravery of William Carron, we decided to name this species after him.

D. canaliculatum normally grows in low woodlands on the papery bark of *Melaleuca viridiflora*. This is a harsh environment with a prolonged dry season in winter and spring (May to December) and usually a heavy wet season in summer and autumn from January to April. On the other hand *D. carronii* grows in transitional mixed forests near the east coast of Cape York Peninsula where the dry season is less well defined with at least some rain in winter and consistently higher humidity levels throughout the year. This area has a seasonal tropical lowland climate with regular maximum temperatures above 30° C and minima rarely below 18° and often above 24° C. It grows on a variety of host trees including various paper-barked melaleucas, *Dillenia alata* and *Lophostemon suaveolens*. There can be some overlap of habitats and the two species do occur together occasionally. *D. carronii* is now known on eastern Cape York Peninsula from the Stewart River north, on the islands of Torres Strait and in the drier, more seasonal areas of southern New Guinea.

When not in flower the two species can be difficult to separate. The colour of the leaves is usually much more purple in *D. carronii* than in *D. canaliculatum*. However this feature is not entirely reliable and the most obvious differences lie in the flowers. The local form of *D. canaliculatum* on Cape York Peninsula has yellow brown floral segments and is locally known as *D. canaliculatum* 'var. *nigrescens*'. Actually this is the form collected by Joseph Banks at The Endeavour River in 1770 and is therefore the type form of the species. The more well-known light coloured southern form is sometimes regarded as a separate species *D. tattonianum* Bateman, however I prefer to regard it as a form of *D. canaliculatum*, perhaps worthy of varietal rank.

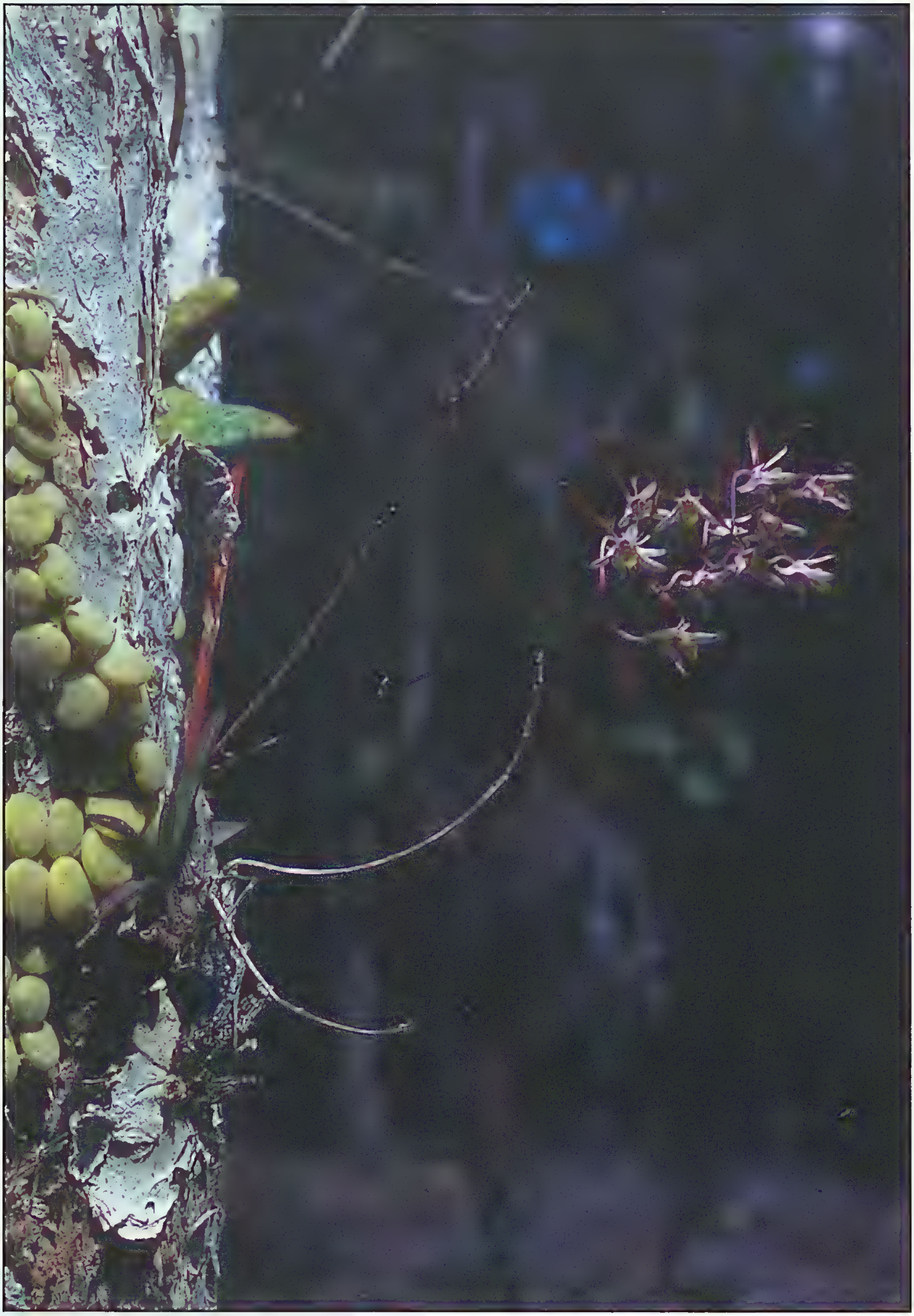
D. carronii plants consist of a tight cluster of several small globular to fusiform pseudobulbs from about 2 to 6 cm long. There are three or four almost terete leaves up to 15 cm long at the apex of the pseudobulb. The inflorescences are up to 20 cm long with a few or, more commonly, numerous small flowers about 2 cm across. The sepals are white, triangular and about 5 x 3 mm. The petals are maroon to purple with a white base and a darker stripe running along the length. They may be twisted once, but no more, and are about 20 mm long and 2 mm wide. The lip is yellow, prominently three lobed, 12 mm long and 7 mm wide. In its natural habitat and even more so in cultivation, *D. carronii* tends to flower in July to August about one to two months earlier than *D. canaliculatum*.

Cultivation has proved difficult and very few people have it growing in their collections. In fact Ray Nichols, a well known grower of hard cane dendrobiums in Townsville, is the only grower I know who has grown and flowered this species over a number of years. Ray has several plants all raised from the flask and all growing well. He attaches the seedlings to slabs with a little sphagnum to help in establishment. The mature plants are then grown under shade cloth in strong light with good air movement and no watering at all from May to October. Ray has had success on slabs of cork and callistemon branches, but finds small slabs of red cedar give the best results. It has proved difficult in the flask with poor germination and slow growth.

There are now many less plants near the Iron Range road due to illegal collecting, but it is probable that good numbers still exist in more remote localities. Because it has proved so difficult to grow, no one should purchase plants that might have originated in the wild. If flasks or seedlings

One of Rays Nicholl's plants on a slab of cork.

Plants of *Dendrobium carronii* often flower when very small.



Plant of *Dendrobium carronii* growing on a paper-barked melaluca with *Dischidia major*.

Photos Bill Lavarack

are available these can be used for cultural experiments, but it is probably much better to purchase and grow hybrids, many of which are becoming available on the market.

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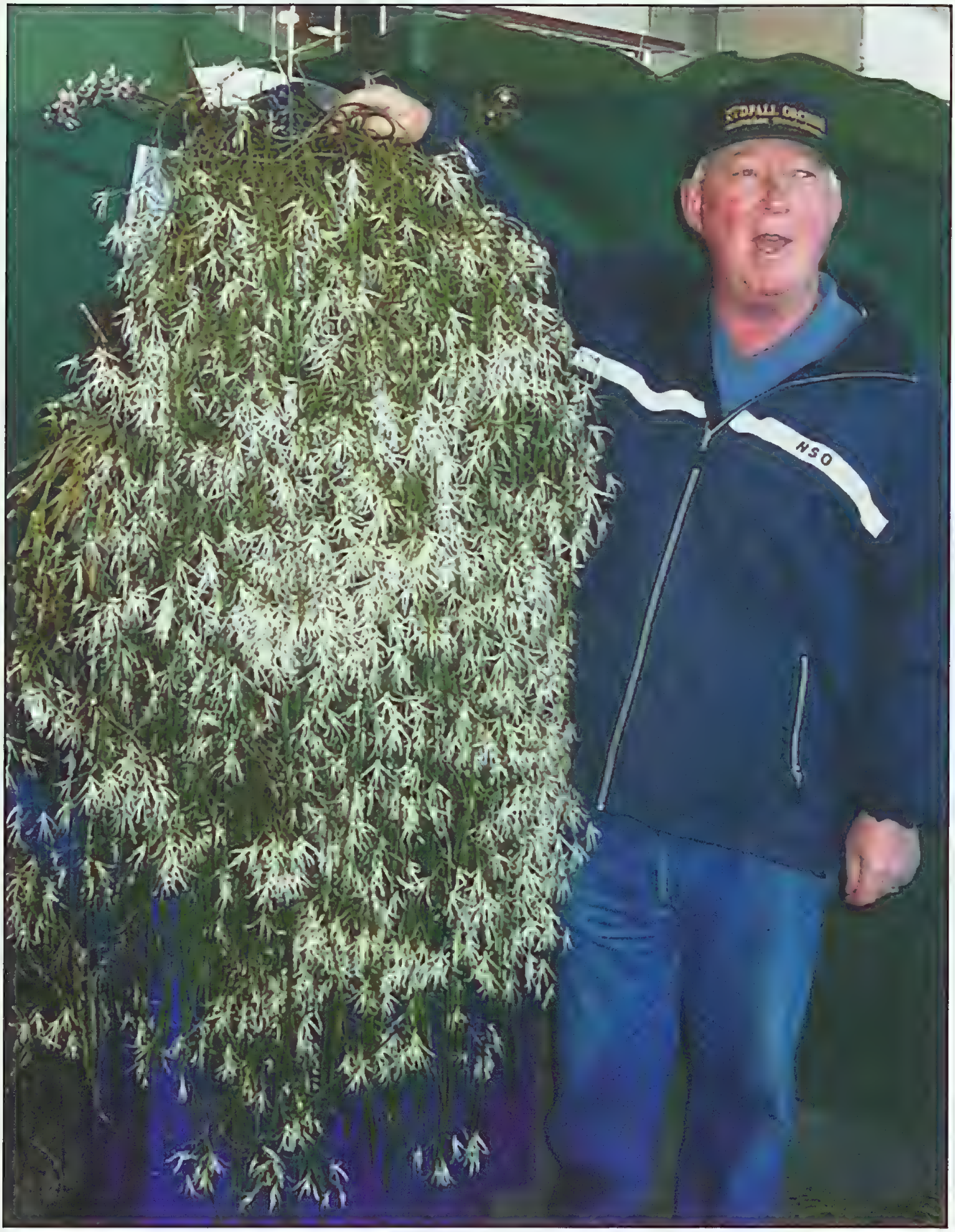

Grahame and his Grand Champion
Dendrobium teretifolium var. fairfaxii "Kevin" CCC-FCC/OCNZ
(Syn: *Dockrillia fairfaxii*)

Dendrobium teretifolium* var. *fairfaxii “Kevin” CCC-FCC/OCNZ

(Syn: *Dockrillia fairfaxii*)

The *Dendrobium* entitled *Dendrobium teretifolium* var. *fairfaxii* “Kevin” was recently awarded the prestigious FCC title at Fantasia’s International Orchid Show in Hamilton. The world wide event was attended by 6000 orchid enthusiasts, some of whom traveled long distances throughout New Zealand to attend. The show itself was extremely well organised with attractive displays and throughout the duration of the week long event, the majority of the flowers stayed in prime condition. Indeed, my winning *Dendrobium* as if almost knowing that it was going to be grand champion flowered the best that it had in its 30 year life. The flowers lasted for two weeks, flowering a week before the show and the week of the show. One colleague said to me “How did you get it to flower for the show?” I said “I was completely confident that it would be at its best. I will also add that a fair amount of luck came into it”.

The *Dendrobium* is approximately 30 years old. The plant was originally purchased from Michael Harrison in the early 1980’s. I bought it almost ten years ago and at the time it was a relatively large plant. As far as I am aware it had never flowered. It was brought over from Australia to New Zealand where it has now grown for many years in Auckland. Over the years I have tended to the plant through constant feeding with a light and regular spray liquid fertiliser. It is one of many rainforest teretes but what differentiates this from other teretes is the fact that it grows straight down and does not zig zag. As far as I am concerned it is one of the best because of its growth habits and because it produces many flowers. In order to attain its maximum growing potential it requires good air movement and should have a northerly facing position.

The *Dendrobium* grows up under an opaque roof facing north. It is grown in a large basket full of pine bark and tree fern. As mentioned previously it is fed with a liquid fertiliser every second day at quarter strength through summer months and once a week in winter. Rainforest species can grow into very large plants, but they are often slow to mature. In this way it has very close links to the *Dendrobium dolichophylla*. The flowers themselves are cream to pale yellow with prominent red stripes at their base and generally flower from August to October. The plant is endemic to New South Wales and Queensland. The flowers can be up to 6 cm across and the terete leaves are up to 60 cm in length. The racemes are up to 3 cm long with about one to four flowers. This species can also be grown on a slab of tree fern or hardwood.

As I reflect upon my recent success, I have wondered why in my past showings of the plant it has often been admired but it has not received anything higher than a cultural certificate. It is only now that it has been awarded to its true potential by receiving an FCC. This is the first time that a *Dendrobium* has been given this award in New Zealand. I hope that this will give encouragement in the future to people who grow Dendrobiums.

On a final note, all the orchid societies in New Zealand are to be applauded for the success of Fantasia. When I stood on the balcony and gazed down over the show I felt a sense of pride and joy to be involved in such an event.

Grahame Ivan Leafberg

Habitat - protection or destruction.

Alan W Stephenson
Conservation Officer
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astephenson@vtown.com.au

After writing the heading for this story I thought I had said it all, as there is no other cause more damaging to any species than the destruction of the habitat in which that species exists, regardless of whether the species is an orchid, an earthworm or a white Rhinoceros.

Most persons involved with orchids who are tinged with even the lightest shade of green will be aware of certain events, which have dramatically changed the environmental landscape. Many of these events were perpetrated upon this entity known as an Eco-System long before most of us were born. They are, to name a few, the introduction of rabbits, foxes, prickly pear, cane toads, bitou bush and hard hoofed animals. However, those who introduced these pests have done the greatest damage to this precious eco-system and there are no prizes if the casual reader thinks the perpetrators might be "us", so called modern man.

This analogy is not restricted to Australia, for most modern nations have experienced some form of pest, introduced for a variety of reasons. These might be as varied as something to hunt, as Australian possums introduced into New Zealand for that reason, have been recognised as a pest for many years. Our *Melaleuca* species somehow found their way into the Florida Everglades and have been partly responsible for the reduction of the total area of that magnificent natural wonderland.

The "us" part of the problem should be obvious, as it comes in the form of clearing the landscape to suit modern man and the comforts to which he has become accustomed. This clearing might be for the production of food, a new school, sporting field or a freeway for the motor vehicles we all find so necessary in our increasingly transient lives, as our growing affluence has given us the ability to go far and see things. Ah yes, remember when the Gold Coast was just another area of wetland and Lake Pedder inaccessible to most. The general feeling was at the time as stated by the Chairman of the Tasmanian Hydro Electricity Authority was, "we can improve on that". I thought to myself at the time, he cannot improve on nature however; it can be changed and often is, usually in a way detrimental to the *in situ* species and the landscape in general. And now to the point of this exercise, as I have in recent years become personally involved with this type of exercise although not with the first species I will mention. That very statement was made very recently by a developer with regard to the habitat for *Prasophyllum affine*.

Prasophyllum uroglossum is a terrestrial species known only from a certain area of New South Wales, in particular the Southern Highlands, which by modern freeway is less than 90 minutes drive from the centre of Sydney. *Prasophyllum uroglossum* prefers a habitat on the periphery of peaty wetlands and silty loam, among low grasses and rushes with scattered *Leptospermum sp.* (Ti-Tree.) The story goes like this. The then owner of the farm, which abutted this wetland then known as the Wingecarribee Swamp, saw an opportunity to turn the peat into money and proceeded to mine and sell the peat. He started by just skimming the peat from the surface, letting it dry, and bagging it for sale. However, a neighbour whose property also adjoined the swamp took the mining to a different phase, increasing operations to a much larger scale. All went well for the first year or two but then authorities realised the wet had been removed from the wetland and the orchid habitat was seen to be suffering as a result. A request was made by local and state bodies for the cessation of peat removal. This did not happen very quickly and the government of the day and a subsequent administration were lax in the application of the laws at the time. During this period of bureaucratic dithering, the peat mining became unprofitable and the farmer subsequently decamped leaving a financial minefield behind him, with unpaid employees and an environmental mess, unable to be repaired.

The peat mining activities drained water from the swamp, drying out the orchid habitat and now we are left with less than 24 individual plants and according to one government official "I cannot see how we can retrieve the situation after all this time has passed and the damage done". No matter how much we love our orchids, this species as many others, has no horticultural application (read, no financial return) and the reparation costs would be excessive for such a small number of plants. I would like to think the situation might be repaired by natural means (leaving it alone) but even I am not that naïve. Compare this situation with the recent auction of the first 100 seedlings of the much vaunted Wollemi Pine. These seedlings were auctioned by Sotheby's for the staggering sum of $1,059, 000. I wonder if any orchid species could attain that level of notoriety. If that much money could be channelled to orchid conservation the number of species currently under threat would be drastically reduced.

Another species with which I have been more closely involved is the Eastern Underground Orchid, *Rhizanthella slateri*. Readers of Australian orchid magazines should be familiar with this species but despite it receiving Threatened Species status on December 6th 2002, one site is now a vineyard and another is still under threat from four lanes of a freeway. Various articles by a range of people have been written about this species since its re-discovery in Vincentia in 2001 and Bulahdelah in 2002. (See O/A August 2002, December 2002, February 2003).

Despite the intended release of the Environmental Impact Statement for the proposed by-pass of Bulahdelah in June 2002, nothing has been produced to this date. It was thought the change in portfolios and ministerial responsibilities following the New South Wales state election in March 2003 might be reason for the delay but those matters are well in hand and one can only hope the delay is for all the right reasons.

On the local scene, *R. slateri* is almost certainly in trouble as the Vincentia site is now a vineyard with its own dam. Currently a caravan is on site as a precursor for a more formal residence. I wrote about its plight in a local peace and environment Newsletter (The New Bush Telegraph) and was immediately contacted by the Threatened Species Officer for the local Council who informed me of his dislike for my story. I then asked him how the orchid was to be protected from the changed hydrology of the site due to the ploughing required for and the setting up of the vineyard and whether he thought it might be profitable. He stated the profitability was not a requirement when assessing the Development Application. I also mentioned the probability of contamination from spray drift and leaching of herbicides, pesticides and fertilisers used for the production of grapes. He again indicated those matters were also not a consideration of Council. As far as he and Council were concerned, the fact that a fence was to be erected at a distance of 20 metres from the tree under which *R. slateri* was found, was sufficient protection and all that was required of them. As a point of interest, when clearing of the area for the vineyard began I went to take some photos, just for the record. I stood across the road and fired off a few shots and suddenly the driver of the bulldozer came charging at me screaming and shaking his fist. Of course, I departed, as I had the photos I wanted and did not need to be involved in any aggravation. However, a thought occurred to me as I was driving away. If the land clearing was legal as permitted under the DA, why did the driver get so agitated? Perhaps he was a little sensitive to the possibility of destroying a unique and rare orchid.

Since the initial development of the vineyard, no work or maintenance of any type has been undertaken on this site. Weeds are growing where grapes were intended and one must wonder just what was in the mind of the owner when he initially applied for the right to develop such a sensitive site. As I write this story I have been contacted by the Department of Environment and Heritage to comment on the submission to consider *R. slateri* for listing as a Commonwealth Vulnerable species.

Another *Prasophyllum* species has been a source of irritation for five years. It is *Prasophyllum affine,* once thought to occur at one location in the Jervis Bay region. As luck would have it, I stumbled across this species a few years ago but the luck turned sour when the site became the focus of a now existing $12M Leisure Centre and a proposed large regional shopping complex ($60m) with an adjacent 900 lot residential sub-division. It was suggested to dig up the orchids and replant them in another location but when the biological requirements of the species were explained to the unknowing, those thoughts quickly evaporated. *P. affine* is a normal deciduous terrestrial species but problems arise due to a significant reliance on *mycorrhiza* and the fact it does not self-pollinate or reproduce in the normal vegetative style with the proliferation of tubers. Added to this, little was known of its pollination requirements until entomologist Dr. Colin Bower conducted a study in the 2001 flowering season with funding provided by the then landowner.

That study has now been complemented by a further study of the habitat requirements of the pollinators, the main pollinator being *Thynninae* wasps. Original studies of pollinator movements indicated they had the ability to travel only a distance of approximately 70 metres, however, recent data now shows they can occasionally travel up to 200 metres. This study has focussed on the breeding and feeding preferences for the wasps and likely refuge areas in times of stress, eg drought, fires etc. These are important factors as in the 2001 flowering season I assisted officers of the National Parks and Wildlife Service (now Department of Environment and Conservation), with extensive surveys of *P. affine* at several sites and a total of 1146 individuals were counted, with almost 300 on the Vincentia site. These are sprinkled over the 26 hectares, which would make the construction of a large shopping centre very difficult. This brings to notice one of the main features of any environmental assessment, “if we look after the habitat, the species will take care of themselves”. This is true regardless of whether the species is flora or fauna.

At this juncture one fact regarding terrestrial orchids and surveys for them must be noted. To conduct a proper, honest and realistic survey, the site in question must be surveyed over a period of at least three and preferably five years. As no level of government, or a commercial entity is willing to wait five years to grant permission to develop any site, particularly with the developers applying pressure chanting their constant mantra of “it’s costing us money and what about the jobs this will create”, even three years is considered an excessive time frame. This time frame is required so as to accommodate at least one year of drought, bushfire or perhaps a flood. In the Shoalhaven area in which I live two of these factors have been realities in the last two years. Over the last two years the value of the time frame has been made very obvious due to the previously mentioned factors of drought and fire. Fires devastated large areas of the Shoalhaven Shire in the summer of 2001 and returned again to repeat the damage in 2002, culminating in the worst drought in this district and much of NSW in 100 years. The end result was that in the good survey year of 2001 orchids proliferated but the opposite occurred in 2002 as on the Vincentia site, not one individual plant of *P. affine* could be found in flower and the other sites fared no better.

How careful can one be with a threatened species? Some even ask why it is a threatened species. To this I say, *P. affine* was originally discovered by Robert Brown in 1803, between South Head and Botany Bay in New South Wales, tell me what is now found in that location. After thinking most will say houses, roads, schools, hospitals, a prison, several good golf courses and then the realisation hits home. The habitat of the orchid is now heavily urbanised and all individuals in that original habitat locality are extinct.

The Vincentia site was the subject of an extensive Environmental Impact Statement but somehow *P. affine* was not noted. At this point please use your imagination as to why it was not recorded. But to stimulate the imagination I will give a brief explanation. Historical knowledge indicated the presence of two threatened species of orchid *in situ*, *Arachnorchis* (syn *Caladenia*) *tessellata* and *Cryptostylis hunteriana*. The former is found in flower in late September to early November and the latter from late November to early January, with *P. affine* in flower between these times. All species are deciduous with *Cryp. hunteriana* being a saprophyte. The survey was conducted in March six weeks after a wildfire had decimated the area and no more needs to be said. *Arachnorchis tessellata* was not located and is now probably extinct in that immediate area, as the site of its original local discovery has been a (now defunct) *Pinus radiata* plantation since 1969. *Cryptostylis hunteriana* is still evident with an adjacent site supporting an excellent colony of over 60 plants and as of 22-11-03 at least 23 individual plants of *P. affine*. This site is earmarked as the site for a Church, school and sporting field. To those who know me, these facts explain the often-raised voice and surly attitude.

Fortunately, in October 2004 a scientist from the Australian National University discovered *A. tessellata* at a site to the west of Nowra. Following his phone call to me I visited this site and located 20 species with more to be identified. These are *Thelymitra sp.* and require more sunlight than has been available on the days of my visits. One redeeming factor of this site is its security from commercial development, industrial development or roadwork, so we can be assured this population will survive.

However, many of the situations mentioned are not unique to my district, state or Australia in particular. They are common to all countries where the gems of nature are found, again irrespective of *flora* or *fauna*.

I should not need to add the footnote that every person involved with orchids should be aware of what is around them. Go for a walk, have a look and at the very least you will keep the heart condition at a manageable level but never be surprised at what you will find or where it will be seen. Orchid species will make a home in the strangest of places and some will be found in unrecorded locations, if for no other reason that the person who wrote the book probably has not been to your favourite site.

-oOo-

6th ANOS Conference and Show

In September 2004, at a meeting of ANOS Inc. held in conjunction with the 5th ANOS Conference in Campbelltown, it was decided to accept a proposal from the ANOS (Qld) Kabi Group Inc. to host the 6th ANOS Conference and Show in Brisbane in 2007.

Consequently the Kabi Group appointed a subcommittee to organize this event and it has had several meetings at which the following decisions were taken:

1. The dates of the event will be :
Wednesday the 29th of August to Sunday the 2nd of September 2007.

2. The **venue** chosen is:
Riverglenn Conference Centre, Indooroopilly
This centre will be booked as exclusive use for the event and has excellent facilities for the Show, The Conference, the Cocktail Party, the Dinner, Vendor stands etc.

Additionally there is on-site accommodation (single rooms only) available at well below commercial rates for bed and breakfast.

Indooroopilly is a suburb located about 10 minutes drive west of Brisbane CBD. Riverglenn has good public transport to it and excellent parking areas within its spacious grounds.

3. The 6th ANOS Conference **logo** will be:
An artistic representation of *Pterostylis grandiflora*, a magnificent terrestrial species found in abundance in SE Qld. It should be in flower at around the time of the Conference. The artwork has been prepared and a letterhead designed.

4. **Registration fees** have been discussed, and every indication is that these will be most reasonable, commensurate with past events even allowing for inflation. The committee's aim is to make the event both memorable and affordable for all ANOS members.

A variety of packages will be offered incorporating such options as single or double, with or without dinner, cocktail party, accommodation etc.

The intention is to release further details of these once prices and funding details are locked in and a reasonably accurate cost can be calculated. It is anticipated that this will occur in about March 2006.

Visit our website at http://www.anos.org.au/conference for further information as it becomes available. To be included in an email list to receive updates about this event please send a message to: **agroffen@gil.com.au**

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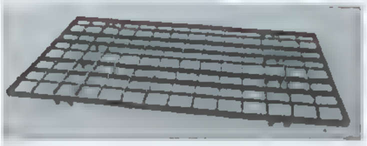

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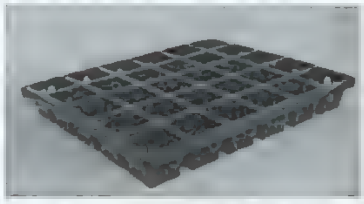

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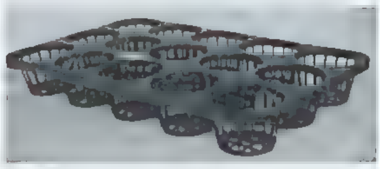

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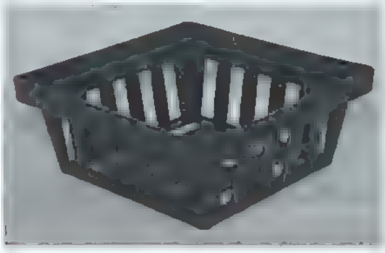

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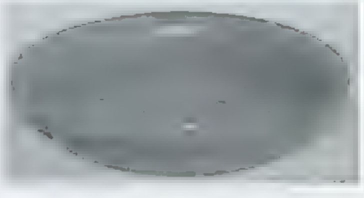

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2005 A.N.O.S. Kabi Show

The Kabi Group held its 3rd Annual Australasian Native Orchid Show at the Lawnton Showgrounds on 26th and 27th August. Due to the long dry period in South East Queensland the numbers of *Dendrobium speciosum* were slightly down on previous years but still created a marvelous spectacle. With the exception of a couple of classes, there was a great display of plants in the rest of the classes.

Saturday was an extremely busy day with two buses visiting the show. Sunday was a surprise packet with a larger than usual number of visitors. I think this overall increase in attendance was due to the support given us by the local press. One newspaper made our show the feature article in their "What's On" section. The article covered two thirds of a page and included a colour photo of Native Orchids. A most impressive advert which cost us nothing.

Our commercial vendors were kept busy with customers enthusiastically buying the various products. The show received very good reviews from the public and is now regarded as a "must visit" show in south East Queensland. It has taken a number of years and a lot of hard work to reach this position, the show having been conducted by the Northern Regional Council prior to Kabi assuming responsibility for it in 2003.

Perpetual Trophy winners were:-

Champion Species
Dendrobium macrophyllum var *giganteum* 'Tari'
Grower : Jon Cara

Champion Hybrid
Dendrobium Monroe
Grower : Brian Richards

Champion Specimen
Dendrobium Telekon
Grower : Ross & Rhonda Harvey

I congratulate all members who won places in the different classes. In particular I thank all members who gave their time in setting up, benching plants and performing all the various tasks required for a successful show.

Eddie Boudette

-oOo-

Corrections.

David L. Jones

Two errors occurred in our recent paper – Jones, D.L. & Clements, M.A., Miscellaneous nomenclatural notes and changes in Australian, New Guinea and New Zealand Orchidaceae, *Orchadian* 15(1): 33-42 (2005). They are corrected here and this becomes the place of publication.

Myrmechila trapeziformis (Fitzg.) D.L.Jones & M.A.Clem., comb. nov.
Basionym: *Chiloglottis trapeziformis* Fitzg, *Austral. Orch.* 1(3): [t.9] (1877).

Bryobium intermedium (Dockr.) D.L.Jones et M.A.Clem., comb. nov.
Basionym: *Eria intermedia* Dockr., *Austral. Pl.* 3: 120-121 (1965).

Theft of *Rhizanthella slateri* plants.

A clump of *Rhizanthella slateri* plants has been stolen from the Bulahdelah population. When last checked in April 2005 there were 4 new flowerheads developing and two heads from the previous year with developing seed pods. When checked in October all heads were found to be missing. Site evidence shows the loss was not from natural predation.

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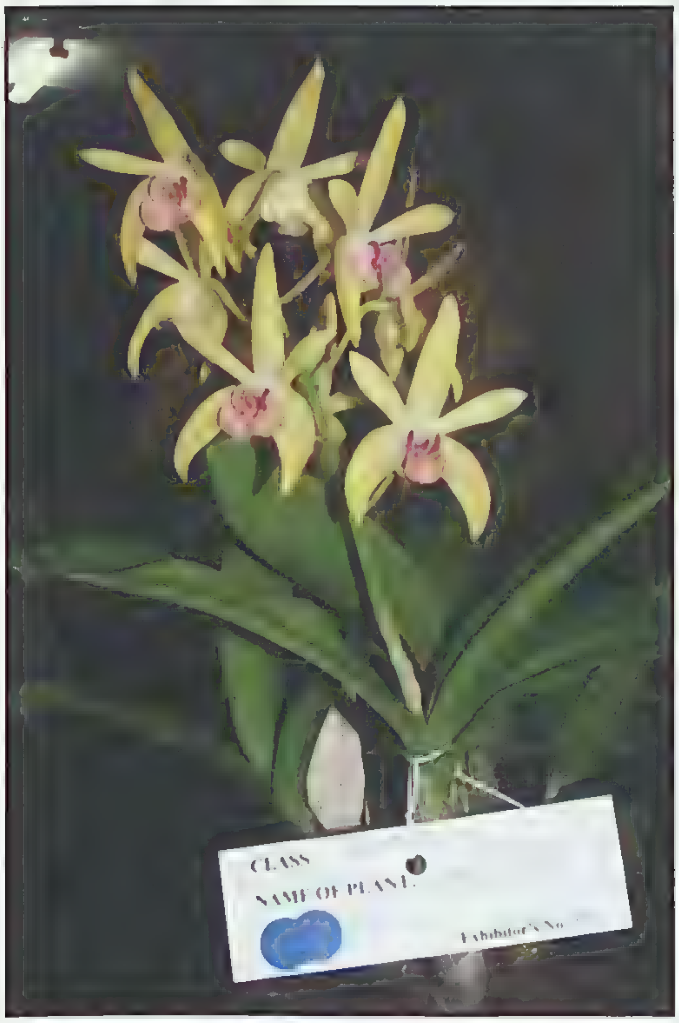
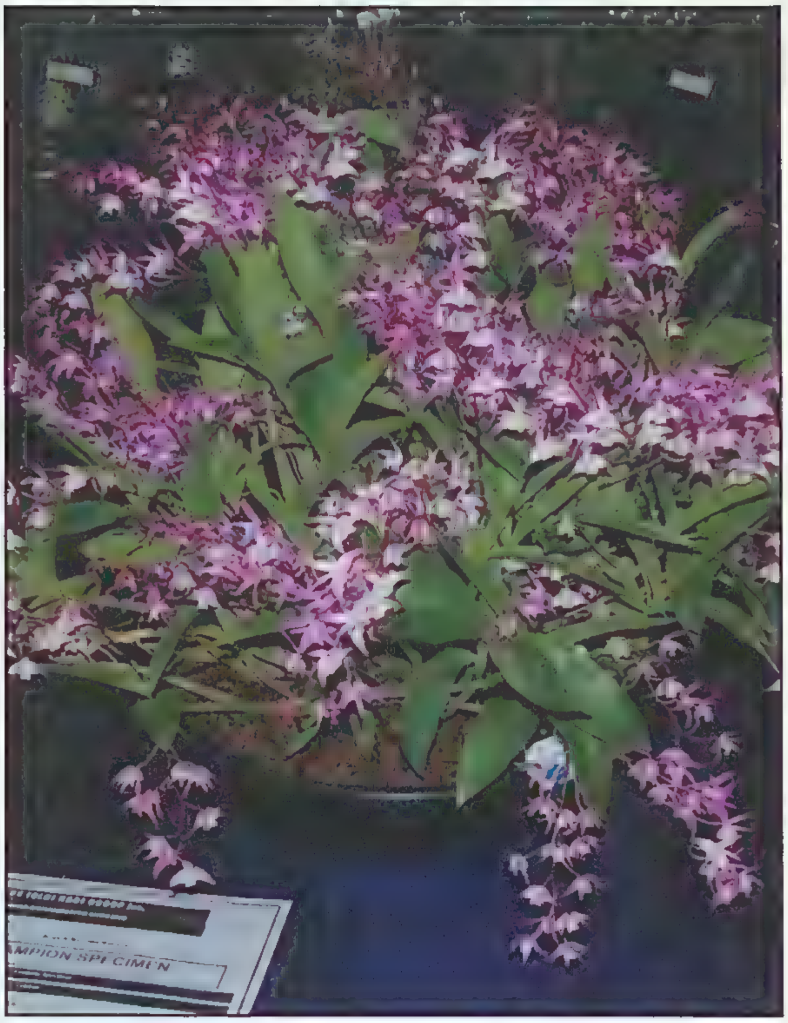
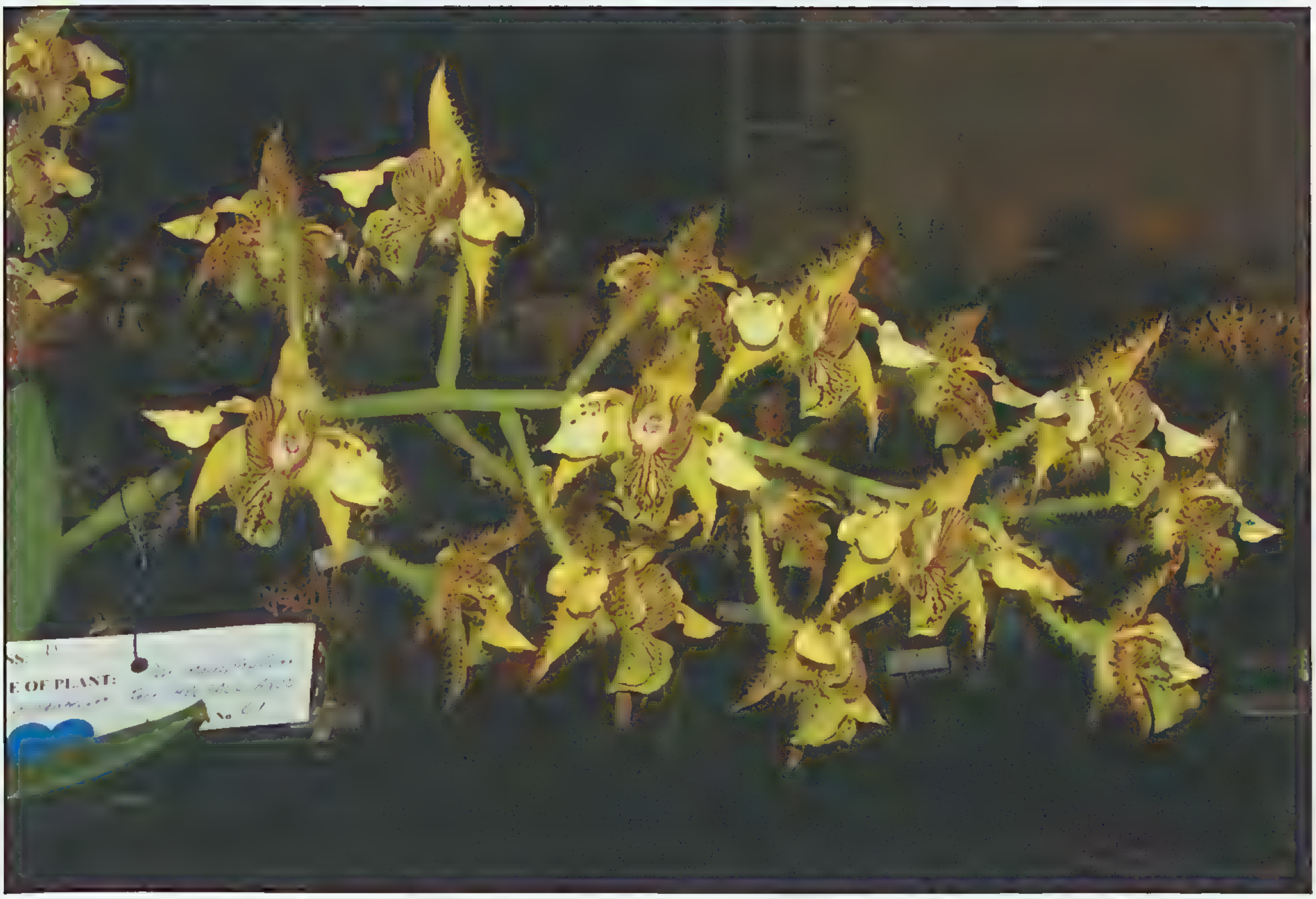


Champion Hybrid: *Dendrobium* Monroe
Grower : Brian Richards



Champion Specimen: *Dendrobium* Telekon
Grower : Ross & Rhonda Harvey



Champion Species: *Dendrobium macrophyllum* var *giganteum* 'Tari' Grower : Jon Cara
Photos Eddie Boudette

Two new species of *Arachnorchis* (Orchidaceae) from South Australia

2775,993

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Abstract

Arachnorchis aurulenta and, *A. interanea,* both from South Australia, are described as new.

Key Words

Orchidaceae, *Arachnorchis aurulenta, A. interanea,* new species, Australian flora, South Australia.

Introduction

Following the publication of results obtained from detailed studies into the Orchidaceae of Tasmania (Jones 1998), a project has been initiated to carry out similar research into the orchid flora of South Australia. Four field trips into various parts of the state together with the examination of numerous collections of fresh material sent in by field operatives have shown that some taxa have been misinterpreted, a number of poorly known taxa are in need of characterisation and full description and many new species await formal recognition. In this paper two taxa of *Arachnorchis* in the *A. dilatata/tentaculata* complex are described as new.

Materials and Methods

Descriptions of taxa were made from fresh specimens. Dried specimens of *Arachnorchis* were examined from the following herbaria: AD, CANB, CBG, HO and MEL. Unless otherwise indicated, all types of *Arachnorchis* species relevant to this study (or photographs thereof) and collections cited have been seen.

Taxonomy

1. *Arachnorchis aurulenta* D.L.Jones sp. nov., affinis *A. dilatata* (R.Br.) D.L.Jones & M.A. Clem. sed florescentia superiore; relative parvifloribus; et osmophoris sepalinis crassis, aureis ensiformibus olivaceis, differt.

Type: South Australia. Scrubby Creek Station, Gawler Ranges, 9 Sep. 2000, *D.L.Jones 17452 & M.Garratt* (holo CANB; iso AD, BRI, MEL, NSW, PERTH).

Hirsute terrestrial herb. Leaf linear-lanceolate to lanceolate, 5-10 cm long, 5-11 mm wide, dull green, base irregularly blotched with purple, hirsute with patent, whitish, eglandular trichomes to 2 mm long. Scape 10-20 cm tall, wiry, densely hirsute with patent, whitish, eglandular trichomes to 3.5 mm long. Sterile bract spreading from the scape, linear, 15-20 mm long, 2-3 mm wide, externally hirsute, margins involute, apex long-acuminate. Fertile bract closely sheathing, oblong-lanceolate, 13-20 mm long, 4-6 mm wide, externally hirsute, apex acuminate. Flower usually solitary, c. 3-4 cm diam., pale yellowish green with red central tepalline stripes and thick, golden yellow (occasionally brownish) terminal sepaline osmophores; dorsal sepal erect, slightly incurved or recurved, lateral sepals porrect to obliquely deflexed, crossed, parallel or slightly divergent, petals decurved. Dorsal sepal narrowly linear-oblanceolate in the proximal half, 28-35 mm long, 1.6-2 mm wide, narrowed in the distal half to a linear-filiform, channelled section c. 0.3 mm wide, terminated by a prominent, thickened, osmophore, 5-12 mm long, c. 1.3 mm wide, with sparse, immersed and protruding, cylindrical, brownish, glandular cells. Lateral sepals linear-lanceolate, 25-32 mm long, 3-4 mm wide, broadest and falcate in the proximal half then abruptly narrowed to a linear-filiform, channelled section c. 0.3 mm wide, terminated by an osmophore similar to that on the dorsal sepal. Petals narrowly linear-lanceolate, 20-23 mm long, 1.5-1.8 mm wide, tapered to a long-acuminate apex. Labellum articulated on a short claw c. 1 mm long, c. 1.8 mm wide, pale green with a dark maroon mid-lobe and dark maroon calli. Lamina strongly three-lobed, broadly cordate-deltate in outline when flattened, 14-

16.5 mm long, 13-14.5 mm wide, erect in the proximal third, central third nearly horizontal, distal third strongly recurved; lateral lobes c. 4 mm across, erect, proximal margins entire, distal margins with four to six, obliquely erect, subacute, linear teeth 3-5 mm long; mid-lobe ovate-deltate when flattened, 7-9 mm long, 5-6.5 mm wide, marginal calli 5-8 pairs, short, obtuse, papillate, decrescent towards the apex. Lamina calli dark maroon, in 4 crowded rows, extending onto the base of the mid-lobe, stalked, decrescent towards the labellum apex; basal calli linear-clavate, 2.3-2.6 mm long, stalked, head swollen, asymmetrical, c. 0.7 mm across; longest lamina calli c. 2.4 mm long, stalked, head prominently swollen when viewed from the side, ovate-oblong from above. Column broadly winged, 14-15 mm long, 6-8 mm wide, strongly recurved in the proximal half then erect, transparent, with pink to red flecks and striae; basal glands clavate, c. 1.2 mm long, c. 0.8 mm wide, shiny yellow, with a few glandular trichomes. Anther ovate, c. 4 mm long, c. 3 mm wide, yellow, with a linear rostrum c. 0.5 mm long. Pollinia four, clavate-falcate, c. 3 mm long, flat, dark yellow, mealy. Stigma more or less circular, c. 3 mm wide, sunken. Capsule not seen.

Distribution and Ecology

Occurs in the Gawler Ranges, South Australia, where currently known only from Scrubby Creek Station and Mt Granite, but probably occurring at other sites. At the former locality it grows in small shallow gullies in sparse *Acacia* shrubland with the orchids mainly congregated close to the shrubs where they receive some protection from the canopy. The soil is a grey-brown sand which under the shrubs has a surface layer of leaf litter. On Mt Granite this species grows among broombush and mallee in accretions of gravelly loam between granite and porphory rocks. Altitude: c. 300-420 m. Flowering period: Late August and September.

Notes

A very distinctive member of the *A. dilatata* complex which is readily recognised by the relatively small flowers with thick golden bayonet-like osmophores on the sepals and a relatively small labellum with thick clavate calli. It is possibly allied to *A. macroclavia* (D.L.Jones) D.L.Jones & M.A.Clem. but that species does not extend as far inland, has a larger labellum, and thick brown sepaline osmophores.

The habitat at the type site suggests that this species is relatively drought tolerant and able to take advantage of the slightly more amenable conditions created by the scant protection of shrubs at the heads of small gullies and the thin accumulation of leaves and other litter on the soil surface.

Conservation Status

Poorly known, apparently of restricted distribution and not known to be conserved. I suggest a conservation status category of 2KV according to Briggs & Leigh (1996).

Etymology

Derived from the Latin *aurulentus*, made of gold, ornamented with gold, in reference to the prominent golden clubs on the sepals.

Other Specimens

South Australia. Mt Granite, W end of Gawler Ranges, 9 Sep. 2000, *Jones 17454 & Garratt* (CANB).

2. *Arachnorchis interanea* D.L.Jones sp. nov., affinis *A. tentaculato* (Schldl.) D.L.Jones & M.A.Clem. sed scapo longo; floribus paucioribus; labello ad florem relative grandi; et osmophoris sepalinis parvioribus, differt.

Type: South Australia. Mt Granite, W end of the Gawler Ranges, 9 Sep. 2000, *D.L.Jones 17455 & M.Garratt* (holo CANB; iso AD, MEL).

Hirsute terrestrial herb. Leaf linear-lanceolate to lanceolate, 4-18 cm long, 5-12 mm wide, dull green, base irregularly blotched with purple, densely hirsute with patent, whitish, eglandular trichomes to 5 mm long. Scape 16-65 cm tall, wiry, densely hirsute with patent, whitish, eglandular trichomes to 5 mm long. Sterile bract spreading from the scape, linear-oblong, 15-20 mm long, 3.5-6 mm wide, externally hirsute, margins involute, apex acuminate. Fertile bract closely sheathing, broadly ovate-lanceolate, 13-16 mm long, 6-10 mm wide, externally hirsute, apex acute to acuminate. Flower usually solitary, c. 5 cm diam., green with dark red central tepaline stripes and narrow, brownish sepaline osmophores; dorsal sepal erect, incurved or recurved, lateral sepals obliquely deflexed to deflexed, parallel or slightly divergent, petals deflexed. Dorsal sepal narrowly oblong-lanceolate in the proximal half, 35-50 mm long, 3-4 mm wide, narrowed in the distal half to a long linear-filiform, channelled section c. 0.1 mm wide, terminated by a narrow, slightly thickened osmophore, 4-10 mm long, c. 0.8 mm wide, with sparse, brown to purplish, immersed, globose glandular cells. Lateral sepals linear-lanceolate, 30-40 mm long, 4-5 mm wide, broadest and falcate in the proximal half then abruptly narrowed to a linear-filiform, channelled section c. 0.1 mm wide, terminated by an osmophore similar to that on the dorsal sepal. Petals narrowly linear-lanceolate, 24-33 mm long, 1.8-2.2 mm wide, tapered to a long-acuminate apex. Labellum articulated on a short claw c. 1 mm long, c. 2 mm wide, green with a dark maroon mid-lobe and dark maroon calli. Lamina strongly three-lobed, broadly ovate-cordate to cordate-deltate in outline when flattened, 14-17 mm long, 17-20 mm wide, erect in the proximal third, central third nearly horizontal, distal third recurved; lateral lobes c. 6 mm across, erect; proximal margins entire; distal margins with three to eight, obliquely erect, subacute, linear teeth 3-8 mm long; mid-lobe ovate-deltate when flattened, 7-10 mm long, 5-6 mm wide, marginal calli 3-6 pairs, short, obtuse, papillate, decrescent towards the apex. Lamina calli dark maroon, in 4 crowded rows, extending onto the base of the mid-lobe, stalked, decrescent towards the labellum apex; basal calli linear-clavate, 4-5 mm long, stalked, head clavate, asymmetrical, c. 1 mm across; longest lamina calli c. 2.5 mm long, stalked, head clavate when viewed from the side, linear from above. Column broadly winged, 19-22 mm long, 5-7 mm wide, strongly recurved in the proximal half then erect, transparent, with pink to red flecks and striae; basal glands obovate-clavate, c. 3.5 mm long, c. 0.9 mm wide, shiny yellow, with numerous glandular trichomes. Anther ovate, c. 4.5 mm long, c. 3 mm wide, yellow, with a linear rostrum c. 0.7 mm long. Pollinia four, clavate-falcate, c. 4 mm long, flat, dark yellow, mealy. Stigma more or less circular, c. 3.3 mm wide, sunken. Capsule not seen.

Distribution and Ecology

Widespread and common in inland ranges of the Eyre Peninsula to the north of a line more or less between Wudinna and Kimba. It is particularly common in the Gawler Ranges and also occurs on isolated hills such as Carrapee Hill. Grows on moderate to steep slopes in crevices, fissures and terraces among granite and porphory outcrops in accretions of gravelly loam. These sites are covered by shrubs dominated by *Acacia*, *Grevillea* and broombush. Altitude: 250-450 m. Flowering period: late August to early October.

Notes

A robust species of the *Arachnorchis dilatata* complex with relatively small flowers on a tall scape, disproportionately large labellum and small thin brownish clubs on the sepals. This species apparently has as its closest congener *A. tentaculata* (Schldl.) D.L.Jones & M.A.Clem. It can be distinguished from that species by its smaller flowers, shorter marginal labellum teeth, thinner calli and the lateral sepals being deflexed rather than upswept.

Conservation Status

Relatively widely distributed, locally common and conserved.

Etymology

From the Latin *interaneus*, inward, interior, in reference to its distribution in inland habitats.

Acknowledgements

I thank Bob Bates for information about these taxa, the owners of Scrubby Creek Station for access to their property, Marion Garratt for technical assistance, Mark Clements for reading the manuscript and Laurie Adams for the Latin diagnoses.

Literature Cited

Briggs, J.D. & Leigh, J.H. (1996). *Rare or Threatened Australian Plants*, Revised Edition, CSIRO and Australian Nature Conservation Agency.

Jones, D.L. (1998). Contributions to Tasmanian Orchidology, 1-9. *Austral. Orch. Res.* 3: 1-224.

-oOo-

Myall River boat trip.

Peter Denning
Newcastle Group

For those members who were unlucky enough or not quick enough to get a seat on the boat trip should already be standing in line for the next planned boat trip. This is the first time I have travelled up this river system, even though as a boy my parents took us kids camping year in and year out at Jimmy's Beach Camping Area. The bird and aquatic life along this system was just amazing.

The trip started from the cruise terminal at Nelsons Bay and headed across the bay towards the mouth of the Myall River with the skipper giving a running commentary. Once entering the mouth of the river a few members headed outside to the stern of the boat to enjoy the smooth ride up the river. It was not long before we sighted a small number or river dolphins and followed them on the drift back down river. Leaving them behind, we again headed up river passing Tea Gardens and on towards the Myall Lakes.

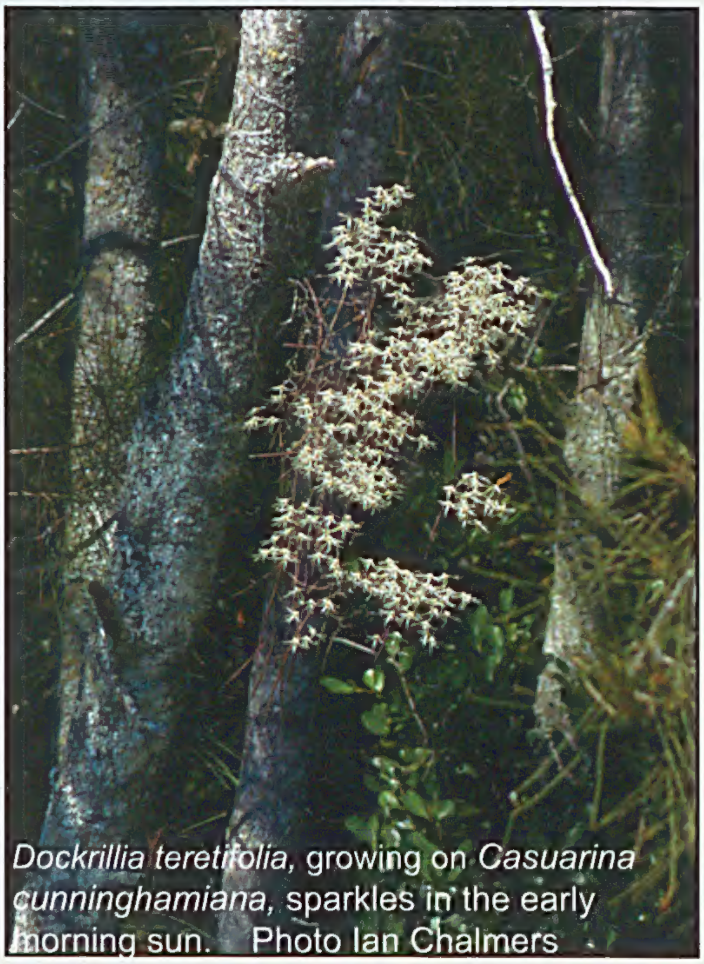
There are many channels throughout the Myall River system and one could only imagine how easy it would be to get lost. The bird life along the river was incredible with ducks, cormorants, kingfisher, sea eagles and kites. The later two giving a demonstration on how fishing is done in these waters and how to avoid having your food taken from you once you caught it.

Stopping for morning tea, members alighted from the boat and did a search for any orchids in the area. Two species were found, a variety of *Caladenia* and a small plant of *Dockrillia teretifolia* which was growing on a river oak (*Casuarina cunninghamiana*). With the sound of the boat's horn the warning was given to return or be left behind.

Travelling up river it was not long before a voice would yell out, "There's one", "There's another" or "Look over there". *Dockrillia teretifolia* were growing on the river oaks on both sides of the river. Some were only one metre above the river and others growing higher up in the trees. This continued on until we tied off on a jetty near some fishing huts for lunch. It was here that I must say and many on the boat would agree that the biggest *Dockrillia teretifolia* specimen that we have ever seen was found growing at the rivers edge and in full view of the fishing fraternity that lived here. It was over two metres in length and was in full bloom. The disappointing thing was that a fire had been lit underneath it at some time and had singed a number of flowers.

Although the variety of orchids seen were only small in number the trip up the Myall River to view the *D. teretifolia* growing on the river oaks along the river bank was in itself just an amazing sight. Seeing these orchids in their natural habitat and in full bloom you can truly understand why this orchid is commonly called the Bridal's Veil Orchid. I must thank both John Lojszczk for making the initial enquiries and organising the boat trip and Sandra Radford for filling in for John while he was away. Great job, guys. I look forward to the next trip.

-oOo-



Dockrillia teretifolia, growing on *Casuarina cunninghamiana*, sparkles in the early morning sun. Photo Ian Chalmers

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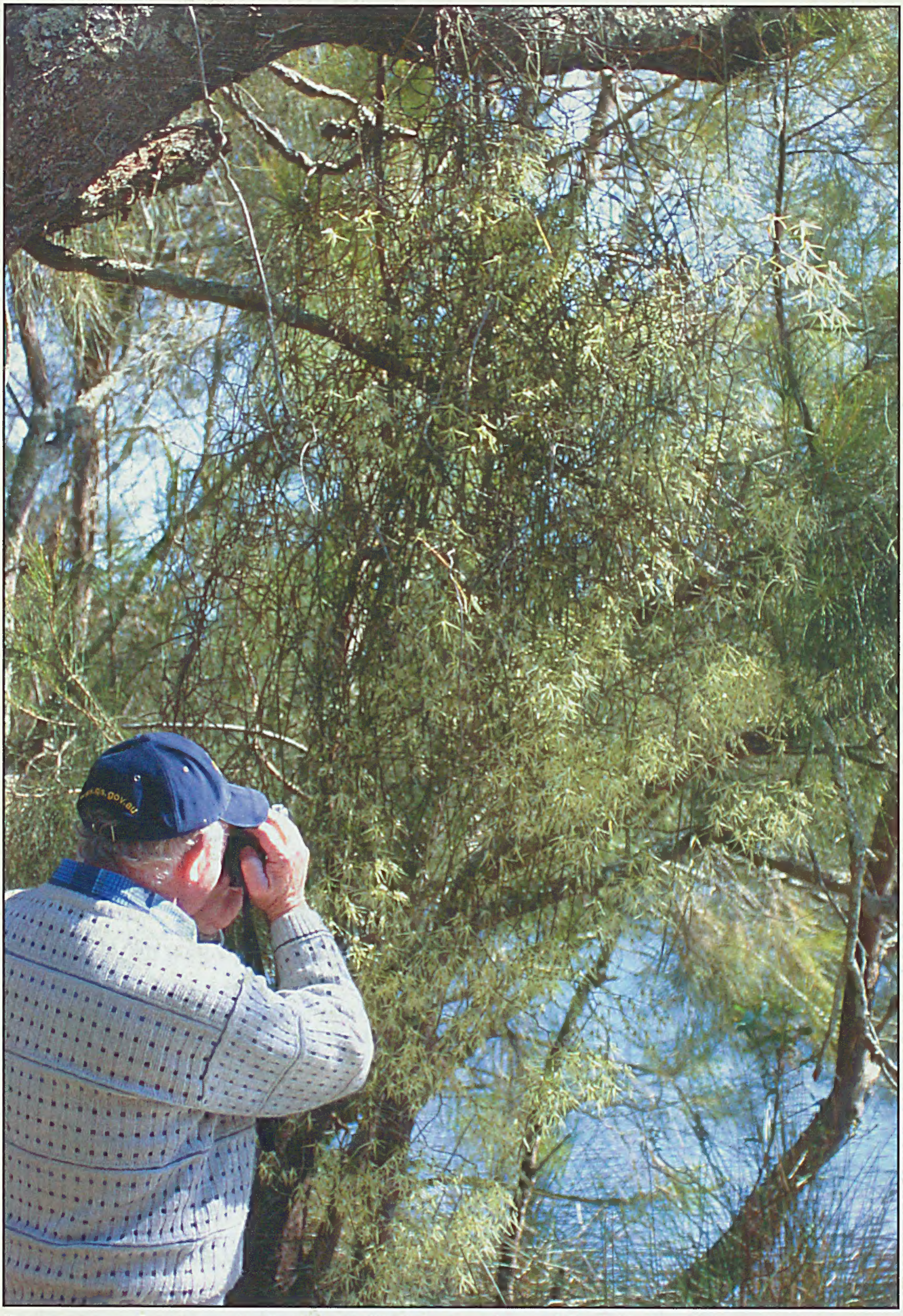

It was a case of queue up to photograph this large specimen of *Dockrillia teretifolia* on the Newcastle boat trip.
Photograph Ian Chalmers